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INPUT AND OUTPUT DISTRIBUTION NETWORKS IN THE AGRI-BUSINESS SECTOR IN RWANDA: MARKETS OR PRE-MARKETS?

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Table of Contents

List of Tables

List of Figures

Executive Summary

The input and output distribution systems of the agricultural sector in Rwanda were examined in this study. The large intervention by the EEC and the government in the fertilizer distribution system has generated pre-market conditions in this subsector. The pre-market stage describes the prevailing market structure where the existing institutions for the most part operate on a supply-leading approach, rather than demand driven, and provide in-kind subsidies to promote the development of agriculture. It is only recently with new economic opportunities, realized through potato production and regional exports, that an effective demand for fertilizer has finally emerged. This has induced several private entrepreneurs to take the initiative to market fertilizer. With access to finance and information, and minimum investment or specialization, entrepreneurs are able to engage in spot market activities to market fertilizer in wholesale and retail markets. The import level, however, is still largely distorted by the price subsidy which precludes the emergence of any private sector initiative at this level of operation.

Pesticides, in contrast to fertilizer, are imported into Rwanda by a few private entrepreneurs. At the same time, the parastatal institutions, APNI and OCIR-CAFE, import pesticides at close to world market prices. Therefore, the marketing of pesticides is more demand driven than fertilizer, where only the fertilizer demand in the potato and tea subsectors are market driven. Pesticides are marketed by private entrepreneurs in wholesale and retail markets largely through spot market transactions.

Financial contracts that facilitate the flow of commodities in the input channels are rather thin. At the import level, parastatal institutions make payments directly from their respective accounts at the BNR to a development fund sponsored by the EEC. Private entrepreneurs, however, who engage in the importation of pesticides use the typical letter of credit which is obtained at a domestic commercial bank. At the wholesale level, all parastatal institutions sell in cash to all types of clients except for OCIR-THE which sells fertilizer on credit to its outgrowers.

Private entrepreneurs handling modern inputs, except for NGOs, also sell in cash to most of their clients, both in wholesale and retail markets. Wholesalers sell modern inputs to NGOs on credit since they are considered reliable customers with an international donor guarantee. Finally at the retail level, most sales are in cash. The NGOs, however, utilize several approaches to assist their clients to obtain inputs resulting in a confusing array of mechanisms. Some NGOs sell inputs at different prices in cash, while others offer credit, and yet others take advance payments, and, not surprisingly, others provide grants to their cooperative or farmer clienteles.

A number of constraints exist for private sector participation in the distribution of modern inputs. First, farmers' demand for pesticides and fertilizer is largely a function of the profitability of their principal crop. Unless farmers are engaged in potato or tea production, they are not very willing or able to purchase these inputs. Second, although entrepreneurs might enjoy some scope economies, scale economies are limited in the agricultural input subsectors,

especially in small markets. Third, the poverty and small land-holding structure in Rwanda restricts large scale production processes that employ yield enhancing inputs and technologies. Access to financial markets does not appear to be a problem for the few entrepreneurs currently involved in the wholesale trade of fertilizer and pesticides. With increased competition, however, trade credit might be a necessary marketing tool, as in the case of other subsectors. The terms of trade credit for fertilizer and pesticides are dependent on the production cycle of the crop on which these inputs are used. Clearly, a higher risk is associated with longer production periods because of increased asymmetric information problems for any input dealer extending credit to farmers.

To promote private sector initiative in the input marketing systems in Rwanda, certain conditions have to be ensured. In the case of pesticides, this implies reducing the quantities imported by parastatal institutions to allow private importers the opportunity to completely take over the import market. This in turn will further induce more private wholesale and retail marketing of pesticides to the extent there is an effective demand for the products. In the case of fertilizer, the primary condition to induce efficient private sector marketing is to completely abolish import subsidies. This would imply that if economic opportunities exist--such as potato production which generates an effective demand for fertilizer--entrepreneurs would have an incentive to enter this subsector.

It is important to continue research efforts that will improve yields through the utilization of improved seed varieties, use of modern agricultural inputs and new technologies. This will help identify and expand the production frontier of many African countries such as Rwanda as they search for their comparative advantage in growing new crops that have an export potential in both regional or international markets. Extension efforts should continue to educate farmers on the advantages of using improved seed varieties, modern inputs and technologies. Effective demand for these inputs and technologies would grow naturally from the farmers' realization of improved yields and higher returns with increased use of these inputs.

The production of horticultural crops in Rwanda is limited. This study examined three relatively important output subsectors: potatoes, the most commercialized crop in Rwanda; dry beans, although a basic staple, the country is least self-sufficient in the production of this crop; and fresh fruits and vegetables--tomatoes, french green beans and bananas--which are important because of their export potential. The wholesale and retail trade in dry beans and potatoes is largely characterized by spot market transactions. Wholesalers, although generally specialized in dry beans marketing, have a low investment in specific assets. Many potato traders are new entrants in the market indicating the low level of asset specificity needed to carry out trading and minimal sunk costs facilitating entry in this market. There are increasingly more dry beans wholesalers becoming involved in potato marketing. Potato production faces few uncertainties with the use of modern inputs. More importantly, with improved yields and higher returns, market uncertainties are very low and regional export opportunities are quite high.

Interestingly, and common to spot market transactions, most wholesale and retail sales of dry beans and potatoes are paid for in cash. Little trade credit flows through the vertical

marketing channel. Wholesale and retail operators, in addition to formal credit, draw upon informal loans from their fellow wholesalers and participate in tontines at the retail level. This horizontal channel of finance at both levels of the marketing chain stands out in sharp contrast to the classic wholesale-retail flows of trade credit common to many developing and developed countries. This likely reflects the lack of well established and secure trading relationships between wholesalers and retailers in these markets in Rwanda that discourage the acceptance of the risk of lending and borrowing. In contrast, the established association among those trading side by side creates sufficient confidence for reciprocal lending practices among these agents.

Perishable fruits and vegetables, tomatoes, green beans and bananas, were examined at the retail and wholesale/export levels. Tomatoes and green beans were typically sold at the retail level in spot market transactions. The production of these vegetables, although associated with relatively low asset specificity, involves relatively large production and market uncertainties. Production uncertainty grows out of the difficulties to control quality unless cultivation is closely monitored, while market uncertainty is strongly associated with the high degree of perishability of these crops. Access to finance in the case of retailers was limited to informal finance, largely tontines, and access to information was limited to the specific local retail markets in which they sell their produce.

The export of non-traditional crops from Rwanda is limited; however, there have been successful attempts to draw up contractual arrangements with green beans and banana outgrowers. These arrangements include resource provisions, production management, and marketing outlets. The current export activities, however, are confined to small scale initiatives. Policy efforts should focus on reducing some of the constraints to promote private sector participation in non-traditional export activities.

The first and most binding constraint to the promotion of non-traditional exports is the small land-holding structure in Rwanda. Relaxing this constraint could be possibly achieved through more efficient cooperative farming systems or larger units of production. This constraint increases transaction costs and reduces scale economies of production. Moreover, it hampers the production of consistent quality produce that has export potential. Technical assistance should attempt to train farmers to grow quality produce. A second constraint hindering the development of non-traditional agricultural exports is access to information and finance. These resources are costly for newly emerging private exporters to secure in Rwanda. Third, air transportation costs are expensive and the availability of regular and reliable air freight services is limited. Attracting airline companies to Rwanda would induce more competition in air cargo which would bring transportation costs more in line with market prices. Fourth, and last, the lack of refrigeration facilities at the airport in Kigali makes the time between harvest and transportation of perishable fruits and vegetables critical. Such facilities would involve large investments and would imply large costs for any single enterprise. However, investment in refrigeration facilities would reduce the constraints on exports.

The prevailing conditions in Rwanda present binding constraints on the development of non-traditional agricultural exports. Public sector and donor intervention, however, could ease

some these constraints. These efforts could largely focus on providing the appropriate information, infrastructure and technical support to encourage exports. A potential role for the government, in addition to improving the quality of physical infrastructure in the country, could focus on stimulating domestic linkages with export markets. Facilitating information flows about foreign markets could be achieved by sending local representatives abroad and providing information about domestic production to donors and foreign firms. Donors could play an important role in supporting local production of quality produce that has export potential. One way to encourage the formation of export firms is to stimulate the creation of venture capital firms. Supporting supply-leading credit programs, however, should be avoided. Donors should carefully evaluate the efficiency and role of support institutions, such as NGOs and cooperatives, that advice farmers on how to grow quality produce. The provision of technical assistance and the dissemination of new technologies to small producers in order to ensure the cultivation of high quality produce is the major challenge in the small land holding setting characteristic of Rwandan farmers.

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I. Introduction

The impact of structural adjustment policy reforms (SAP) initiated in the late 1980s has not been fully realized in many developing economies. An important component of these policies is liberalization of the financial sector and agricultural input and output markets (World Bank, 1989). Financial sector reforms, though successful in removing serious financial market distortions, have yet to bring about the development of financial and institutional innovations to service the small but growing number of private enterprises. Private investments in the agricultural sector are emerging slowly. Pursuing sound macroeconomic policies are a necessary but not sufficient condition for private sector development. Examination of the microeconomic impact of these policies within specific sectors of the economy is important for the study of the growth of these markets.

The agricultural sector continues to be an important economic sector for most African countries. The nature of the economic agents operating in the agricultural input and output markets largely affects the efficiency of these markets. Financial contracts servicing the flow of commodities in the marketing channels also have a direct impact on the evolution of these markets. Thus, documentation of commodity marketing systems, their stage of development, the nature of the agents involved in the marketing of these commodities, and the terms and conditions of the financial contracts used in their operations is necessary to understand the development of the private sector in the agribusiness sector.

This study focuses on financial contracts in the agribusiness sector in Rwanda. Being a small landlocked country in Central Africa, with the highest population density in the continent (250 inhabitants per sq. km) and poor natural resources, Rwanda faces major challenges in its development. Given rapid population growth and a fragile economy, the development of the agribusiness sector and the promotion of the agricultural marketing systems in Rwanda continue to be critical issues. The promotion of non-traditional exports to diversify foreign exchange earnings and the need to feed the growing population are two important reasons to develop agribusiness markets in Rwanda.

The following section presents an initial overview of the Rwandan economy which highlights the importance of this study. Section three discusses the methodology adopted in the study of the agribusiness sector in Rwanda. The agricultural input networks, the agricultural output networks and the non-traditional agricultural exports are decribed in sections four, five and six, respectively. This is followed by a discussion of the constraints on the development

of the agribusiness sector in section seven. Finally, section eight draws together the conclusions and recommendations of the study.

II. Background on Rwanda

Rwanda is one of the smallest African countries with an area of 26,338 square kilometers in the highlands of East-Central Africa. Combined with a population of 7.1 million, a per capita income of about US$270, and life expectancy at birth of 46 years, the country does not have many physical or human resources to assist its development efforts.[1] Although the share of agriculture in the gross domestic product has declined from roughly 75 percent to about 40 percent over the past two and a half decades (Table 1), the sector still provides employment to 90 percent of the population who live in rural areas.[2] Over the past decade, Rwanda has shifted from surpassing its modest population growth with high agricultural production to a reverse scenario (World Bank, 1991). These pressures have pushed Rwanda from self-sufficiency to increased total food imports over the 1980s. With population projections of 9 million for the year 2000 and 17 million for the year 2025, Rwanda will continue to face population pressures in the future.

Table 1. Shares of Gross Domestic Product for Major Sectors in Rwanda, Selected years: 1965-1991.

Year	Agriculture	Industry	Services
(1)	(2)	(3)	(4)
1965	74.8	6.9	18.4
1973	61.0	8.7	30.2
1980	45.8	21.5	32.6
1986	37.0	23.9	39.0
1987	37.0	23.0	40.0
1988	38.0	22.0	40.0
1989	37.0	23.0	41.0
1990	38.0	22.0	40.0
1991	38.0	22.0	40.0

Sources: World Development Report, 1993; Trends in Developing Economies, 1989.

Like many other African countries, Rwanda adopted a Structural Adjustment Program in the early 1990s to address its increasing economic pressures. Compared to neighboring countries, public sector expenditures in Rwanda have been relatively conservative over the two decades following independence. However, the decline in international coffee prices coupled

[1] World Development Report, 1993.

[2] World Development Report, 1993; World Bank, 1991.

with rapid population growth over the past five years have led to a current account deficit largely as a result of an imbalance in the merchandise account (Stryker and Shaw). Policy reforms have included devaluation, relaxation of trade controls, reduction of the budget deficit, and the promotion of exports. These policies, however, have not included comprehensive and complete liberalization of input and output markets. A brief review of the financial and agricultural sectors in the Rwandan economy will further clarify the conditions influencing the development of the agribusiness sector.

1. Financial Sector in Rwanda

This overview of the financial sector in Rwanda has two objectives. The first is to present a brief review of selected macro financial indicators that reveal the degree of financial deepening that has occurred in the economy. The second objective is to provide brief background information on the formal financial institutions of the country.

A. Macro Financial Indicators

The development of the financial sector in Rwanda, like most developing economies, is instrumental to the success of the SAP. Financial markets in Rwanda, however, are still shallow. Conventional monetary indicators, including the growth of money aggregates, the ratio of money to GDP and the relationship between currency and deposits, are used to shed some light on the degree of financial deepening of the economy. The data in Table 2 indicate that the growth rates of M1 (the sum of currency outside banks and demand deposits), quasi-money (time and savings deposits) and M2 (M1 plus interest bearing deposits) have experienced marked fluctuations over the past two decades. First, currency and demand deposits recorded double digit growth over the 1970s. This trend, however, is in contrast to much slower and stable growth over the 1980s. Second, interest bearing deposits have recorded double digit growth rates for most of the 1970s and 80s. The past few years, which were marked by civil unrest, indicate much slower growth of quasi-money. Third, the growth rate of M2 exhibits a similar trend to that of quasi-money. The popular indicator of financial deepening, M2 to GDP, has generally increased from about 13 percent to 17 percent over the past decade (Table 3). This trend has been accompanied by a general decline in the ratio of M1 to GDP coupled with a steady increase in the ratio of quasi-money to GDP. These two ratios are still rather small underscoring the continuing significance of informal finance and barter transactions in the Rwandan economy. Minor disturbances in these trends over the past few years can be explained by the civil unrest that has affected Northern Rwanda from 1989 to 1993.

Another important indicator of the degree of financial intermediation in an economy is the ratio of currency to demand deposits (Table 4, column 3). Although this ratio declined in the 1970s, the trend depicted over the 1980s indicates that the continued willingness to hold currency is at least as strong as that of holding monetary substitutes, such as current accounts. These figures imply that cash transactions are popular in Rwanda and that informal financial transactions likely play a significant role in commercial activity. It is not surprising to have the currency to demand deposit ratio close to one considering that 90 percent of the population live

in rural areas where checking accounts are less developed than interest bearing accounts. The ratio of currency to interest bearing deposits, however, which also decreased over the 1970s and early 1980s has been maintained between 0.5 and 0.6 for the past five years. This further indicates an increased demand for time and saving deposits which might be explained by the growth of financial intermediaries and their branches in the country.

Table 2. Aggregate Monetary Measures in Nominal Terms and Rates of Change in Rwanda: 1972-1992. (millions of FRW)[a]

Year	M1	M1 (%Change)	(M2-M1)	M2-M1 (% Change)	M2	M2 (% Change)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1972	2520		453		2973	
73	3565	41.5	464	2.4	4029	35.5
74	4288	20.3	1063	129.1	5351	32.8
75	4850	13.1	1147	7.9	5997	12.1
76	6516	34.4	1530	33.4	8046	34.1
77	8035	23.3	2104	37.5	10139	26.0
78	8961	11.5	2220	5.5	11181	10.3
79	11255	25.6	2831	27.5	14086	26.0
80	12026	6.9	3200	13.0	15226	8.1
81	11774	-2.1	4209	31.5	15983	5.0
82	11460	-2.7	4712	12.0	16172	1.2
83	12317	7.5	5759	22.2	18076	11.8
84	13343	8.3	6549	13.7	19892	10.1
85	14699	10.2	8731	33.3	23430	17.8
86	17334	17.9	9274	6.2	26608	13.6
87	17791	2.6	11549	24.5	29340	10.3
88	18332	3.1	13159	13.9	31491	7.3
89	16053	-12.4	14132	7.4	30185	-4.2
90	16846	4.9	15020	6.3	31866	5.6
91	18145	7.7	15480	3.1	33625	5.5
92	22631	24.7	15162	-2.1	37793	12.4

Source: International Financial Statistics Yearbook, 1993.

a: M1 consists of currency and demand deposits.
M2 consists of interest bearing deposits and M1.
Quasi Money or (M2-M1) consists of interest bearing deposits.

Table 3. Measures of Financial Deepening in Rwanda: 1972-1992.[a]

Year	M1/GDP	(M2-M1)/GDP	M2/GDP
(1)	(2)	(3)	(4)
1972	6.47	1.16	7.64
73	8.54	1.10	9.66
74	8.71	2.16	10.87
75	9.18	2.17	11.35
76	10.52	2.47	12.99
77	11.22	2.94	14.16
78	11.05	2.74	13.78
79	11.55	2.90	14.46
80	11.13	2.96	14.09
81	9.60	3.43	13.03
82	8.75	3.59	12.35
83	8.67	4.05	12.72
84	8.39	4.12	12.50
85	8.46	5.02	13.49
86	10.18	5.44	15.62
87	10.36	6.73	17.09
88	10.39	7.45	17.84
89	8.44	7.43	15.86
90	8.73	7.79	16.52
91	8.52	7.27	15.79
92	10.18	6.82	17.00

Source: International Financial Statistics Yearbook, 1993.

a: M1 consists of currency and demand deposits.
M2 consists of interest bearing deposits and M1.
Quasi Money or (M2-M1) consists of interest bearing deposits.

Table 4. **Selected Measures of Currency, Demand Deposits and Quasi-Money Indicators in Rwanda: 1972-1992** (millions of FRW).

Year	Currency (C)	Demand Deposits (DD)	C/DD	(M2-M1)	C/(M2-M1)
(1)	(2)	(3)	(4)	(5)	(6)
1972	1446	1074	1.35	453	3.19
73	2003	1562	1.28	464	4.32
74	2553	1735	1.47	1063	2.40
75	2722	2128	1.28	1147	2.37
76	3070	3446	0.89	1530	2.01
77	3948	4087	0.96	2104	1.88
78	4443	4518	0.98	2220	2.00
79	5242	6013	0.87	2831	1.85
80	5689	6337	0.89	3200	1.78
81	6086	5688	1.07	4209	1.45
82	6260	5200	1.20	4712	1.33
83	6662	5655	1.18	5759	1.16
84	7030	6313	1.11	6549	1.07
85	7161	7538	0.95	8731	0.82
86	7686	9648	0.79	9274	0.83
87	8203	9588	0.85	11549	0.71
88	8439	9893	0.85	13159	0.64
89	7744	8309	0.93	14132	0.55
90	8593	8253	1.04	15020	0.57
91	8822	9323	0.95	15480	0.57
92	10321	12310	0.84	15162	0.68

Source: International Financial Statistics Yearbook, 1993.

B. The Banking Industry

Presently, there are seven banks in Rwanda, five of which are under the supervision of central bank authorities, the Banque National de Rwanda (BNR). These are: the Banque Commerciale du Rwanda (BCR), the oldest and largest commercial bank; Banque de Kigali (BK), the second largest commercial bank; Banque Continentale Africaine (Rwanda) (BACAR),

the third commercial bank; Caisse d'Epargne du Rwanda (CER), a national savings and loan institution; and, the Union des Banques Populaires du Rwanda (UBP), a cooperative bank with the largest number of rural branches. The Banque Rwandaise de Development (BRD)--a development bank dependent upon grants--and the Caisse Hypothecaire du Rwanda (CHR)--a mortgage bank--are not supervised by the BNR. Table 5 presents a breakdown of all the banks in the country and their branches. All bank headquarters are in the capital of Kigali and almost all branches of the commercial banks are located in secondary cities in the rural areas. The Union des Banques Populaires is the only bank which has branches in every prefecture and most communes in the country.[3] The total number of branches of all the banks in the country, including headquarter units, was 172 as of end of 1991. This makes the average population to bank branch density ratio equal to 41,279. The population to bank density ratio in Rwanda is comparable to other African countries such as The Gambia where this ratio was 52,941 in 1992.

Table 5. Distribution of Bank Branches in Rwanda: 1990-1991.

Banks[a]	As of 12/31/1990			As of 12/31/1991		
	Headquarters	Branches	Offices	Headquarters	Branches	Offices
(1)	(2)	(3)	(4)	(5)	(6)	(7)
BCR	1	14	3	1	14	3
BK	1	6	3	1	6	3
CER	1	18	4	1	18	3
UBP	1	119	0	1	124	0
BRD	1	3 Posts	0	1	3 Posts	0
BACAR	1	0	0	1	0	0
CHR	1	0	0	1	0	0
TOTAL	7	160	10	7	165	9

Source: GOR, Rapport sur l'Evolution Economique et Montaire du Rwanda, 1991.

a: BCR: Banque Commerciale du Rwanda;
BK: Banque de Kigali;
CER: Caisse d'Epargne du Rwanda;
UBP: Union des Banques Populaires du Rwanda;
BRD: Banque Rwandaise de Development;
BACAR: Banque Continentale Africaine (Rwanda);
CHR: Caisse Hypothecaire du Rwanda.

[3] Prefectures are analogous to counties and communes are analogous to districts.

Nominal interest rates, both deposit and lending, were almost constant over the 1980s in Rwanda (Table 6). Deposit rates, however, were barely positive in real terms. Over the past two years, as inflation jumped to double digit levels in 1991 and 1992, real deposit rates became negative. Lending rates, on the other hand, were substantially positive in real terms until recently when they also fell to a negative value in 1991 with increased inflation. The low deposit rates provide another explanation for the slow and negative growth of interest bearing deposits over the past few years. The lending rate, however, has a direct bearing on the demand and distribution for credit which has fluctuated as well over the years.

Table 6. **Inflation, Nominal and Real Deposit and Lending Rates** (average annual rates).

	Inflation		Nominal Interest Rates		Real Interest Rates[4]	
Period	CPI	GDP Deflator	Deposit Rate	Lending Rate	Deposit Rate	Lending Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1980-87	5.00	4.50	6.25	13.55	1.19	8.14
1988	2.91	2.98	6.25	12.00	3.25	8.84
1989	1.03	6.82	6.31	12.00	5.15	10.78
1990	4.20	0.48	6.88	13.17	2.57	8.61
1991	19.62	12.80	8.75	19.00	-9.07	-0.51
1992	9.51	1.71	7.73	16.67	-1.62	6.54

Source: World Bank, World Development Report, 1989; International Financial Statistics Yearbook, 1993.

The share of private versus public sector credit in total domestic credit has changed over the past decade. The values in Table 7 indicate that the share of public sector credit in total GDP has increased steadily from the late 1980s onwards to reach almost 12 percent in 1992. This trend is in contrast to that of the private sector credit to GDP ratio which reached a high of about 12 percent in 1988, only to decline over the past four years to 7 to 8 percent. On the one hand, the decline in the claims on the private sector may be attributed to more conservative lending practices by commercial banks given the negative real rates of interest and the civil unrest in the country in recent years. On the other hand, the increase in claims on the public sector indicates an increase in expenditures financed through borrowing to cover increases in the budget deficit.

[4] Real interest rates (r) were derived using the formula $r=[(1+i)/(1+p)]-1$; where i is the nominal interest rate and p is the inflation rate (the Consumer Price Index was used here).

Table 7. Outstanding Balances of Private and Public Sector Credit and Ratios of Credit to Total GDP in Rwanda: 1982-92 (millions of FRW).

Year	Total Public Sector Credit[5]	Total Private Sector Credit	Public Sector Credit/GDP	Private Sector Credit/GDP
(1)	(2)	(3)	(4)	(5)
1982	24	9463	0.02	7.23
83	3199	10211	2.25	7.19
84	2866	12357	1.80	7.77
85	2699	15665	1.55	9.02
86	3631	15894	2.13	9.33
87	7703	16541	4.49	9.63
88	9528	20677	5.39	11.71
89	13089	6150	6.88	3.23
90	21156	19135	10.97	9.92
91	18410	15412	8.65	7.24
92	25842	18461	11.63	8.31

Source: International Financial Statistics Yearbook, 1993.

The distribution of domestic credit among the principal sectors of the economy over the period 1987-1992 is presented in Table 8. On the one hand, these percentages indicate a decreasing share of domestic credit to agriculture and livestock after 1989. The share of credit disbursed to coffee and tea has been decreasing as a percent of the total share of agricultural credit as well. This may be explained by the decreased returns from coffee after the drop in international coffee prices. On the other hand, the values in Table 8 indicate an increasing trend in the shares of manufacturing, construction and public works, commerce and services. The share of domestic credit allocated to fertilizer and pesticides within manufacturing is negligible. Similarly, the share of credit allocated to the marketing of food products represents only a negligible share within the broad category of commerce. Interestingly, this indicates that the amount of formal credit associated with agricultural inputs and outputs, other than coffee and tea, is less than one percent. This underscores the continuing predominant role of informal finance in servicing domestic agriculture.

[5] Includes net claims on government plus credit to public entities.

Table 8. Distribution of Domestic Credit by Economic Subsector in Rwanda: As of 12/31/1987-1992 (in percent).

Share of Sector of Activity	1987	1988	1989	1990	1991	1992
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agriculture & Livestock:	35.67	33.80	35.08	9.95	7.58	8.69
Coffee & Tea	28.03	25.01	25.9	4.53	1.09	1.05
Others	7.63	8.78	9.11	5.42	6.49	7.64
Manufacturing & Mining:	10.57	15.69	15.03	17.86	23.45	22.09
Fertilizer & Pesticides	n.a.	n.a.	n.a.	0.13	0.00	0.18
Electricity and Gas	0.03	0.01	0.01	0.21	0.05	0.55
Buildings and Public Works	2.9	2.19	2.06	17.20	21.44	17.96
Commerce:	25.2	22.61	19.78	41.37	32.89	35.60
Food Products	n.a.	n.a.	n.a.	0.77	0.33	0.69
Services	4.6	3.13	4.49	10.57	11.25	11.16
Individuals and Others	21.02	22.56	22.49	2.82	3.30	3.94
Total	100	100	100	100	100	100

Source: BNR, Bulletin No. 19, 1993; GOR, Rapport sur l'Evolution Economique et Montaire du Rwanda, 1991.

a Includes production and agro-industry.

b Mostly imports.

2. Agricultural Sector in Rwanda

Agriculture production in Rwanda is characterized by smallholder farming in which over half of the million rural households cultivate less than one hectare of land (World Bank, 1991). Interestingly, Rwanda differs from many other African countries, and developing countries for that matter, in that there is no well established village structure in the rural areas. Rwandans live in dispersed hillside settlements. Land use is characterized by a large number of small holdings. By law, all land in Rwanda belongs to the government. The densely settled and intensively farmed hillsides and valleys (marais) are made up of predominantly small producers operating with established usufruct rights for their holdings. Cropland comprises roughly 50 percent of the total area and only seven percent of the total cultivated area is used for growing export and industrial crops.[6] Farming technology is traditional and production is largely subsistence oriented (Von Braun et al.). About 63 percent of the value of agricultural production

[6] Export crops are coffee, tea and pyrethrum and industrial crops are rice, sugar and wheat (World Bank, 1991).

in consumed on the farm. The traditional staples are dry beans, sweet potatoes, cassava, sorghum and bananas. The major cash crops, sorghum and bananas, have been used in beer processing. Soil fertility is maintained by fallow and the use of organic fertilizer, such as mulch and manure. Wealth holdings in the form of livestock assets, however, have been decreasing under growing population pressure, diminishing pasture and farm sizes.

The use of modern agricultural inputs was introduced only in the past decade in Rwanda. These modern inputs are used mainly for tea and only more recently for coffee and potatoes. Pesticides and fungicides were only introduced in recent years to increase the yields of coffee and more importantly potatoes. Fertilizer consumption in Rwanda grew from 300 grams of plant nutrient per hectare of arable land in 1979/80 to 2,600 grams in 1990/91 (World Bank, 1993). This may be contrasted with other African countries where there were no increases over the past decade such as in Madagascar (2,500 grams per hectare in 1979/80 vs. 2,600 grams in 1990/91) and others where there was a decrease over the past decade such as in Ghana (6,500 grams per hectare in 1979/80 vs. 4,800 grams in 1990/91). Rwanda, however, is still among the low fertilizer using countries in the world (World Bank, 1991).

Table 9. Structure of Rwandan Agricultural Exports (Quantity in Tons and Value in 1000 FRW): 1991-92.

	1991				1992			
Crop	Quantity	%	Value	%	Quantity	%	Value	%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Coffee	37642.0	72.0	7203890	69.3	33797.0	70.2	4671754	60.1
Tea	13297.0	25.4	2796629	26.9	13405.0	27.9	2761491	35.5
Pyrethrum	31.6	0.1	279303	2.7	26.8	0.1	243504	3.1
Quinquina	209.0	0.4	24123	0.2	318.0	0.7	36172	0.5
Vegetables	117.0	0.2	24014	0.2	139.0	0.3	29910	0.4
Flowers	2.7	0.0	247	0.0	1.5	0.0	136	0.0
Plants	997.0	1.9	66994	0.6	424.7	0.9	28556	0.4
Potatoes	0	0.0	0	0.0	2.4	0.0	38	0.0
Bananas	0	0.0	0	0.0	17.2	0.0	2628	0.0
Maracuja	0	0.0	0	0.0	3.2	0.0	783	0.0
Other fruits	0	0.0	0	0.0	0.7	0.0	194	0.0
Total	52296.	100	10395200	100	48134.8	100	7774972	100

Source: BNR, 1993.

The major export crops are coffee and tea. These constitute about 95 percent of all agricultural export crops both in quantity and value of foreign earnings (Table 9). Non-traditional exports include pyrethrum, bananas, potatoes, fresh vegetables (especially green beans), ornamental plants and flowers. The export of these non-traditional crops began only in the past

few years and they are all largely in their infant stages. The principal destinations of vegetable and banana exports are the EEC countries, Belgium and France in particular, and some regional countries including Burundi and Zaire for potatoes.

Apart from traditional staples, horticultural production in Rwanda is still minimal. Bananas are the most important fruit grown. Its relative share among the categories of agricultural products has been about 52-55 percent from 1989-92 (Table 10). Root crops are the second most important category of crops in terms of quantity (35 percent). Grain crops, although representing the principal food staple, make up only about six percent of total production. Finally, pulses represent only four percent of the total quantity of agricultural production. The total share of fresh fruits and vegetables--excluding bananas and root crops--in total agricultural production is just two percent[7] (Table 11). The mean value of net sales of fruits and vegetables--excluding bananas and root crops--per household in Rwanda represents less than one percent of total household net sales (Loveridge). Thus, it is not surprising that there is almost no documentation about either the production or marketing of fruits and vegetables other than bananas and potatoes.

Table 10. Agricultural Production and Shares of Principal Product Groups (in 1000 Tons): 1989-92.

	1989		1990		1991		1992	
Category[a]	Quantity	%	Quantity	%	Quantity	%	Quantity	%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bananas	2,297	51.8	2,551	55.2	2,502	50.7	2,745	54.9
Pulses	268	6.1	224	4.8	241	4.9	203	4.1
Grains	295	6.7	305	6.6	328	6.7	291	5.8
Root Crops	1,571	35.5	1,545	33.4	1,864	37.8	1,758	35.2
Total	4,433	100	4,625	100	4,935	100	4,997	100

Source: BNR, 1993; MINAGRI, 1989.

a Pulses include dry beans, peas, peanuts and soybeans.
Grains include rice, maize, sorghum, wheat and others.
Root crops include irish potato, sweet potato, cassava and other tubers.

[7] The distribution of agricultural production by crop was last reported for 1989.

Table 11. Agricultural Production by Crop in Rwanda: 1989.

Crop	Quantity (Tons)	Percent
(1)	(2)	(3)
Banana	2,328,901	50.85
Dry Beans	227,964	4.98
Peas	17,667	0.38
Peanuts	15,158	0.33
Soybean	9,030	0.19
Sorghum	179,550	3.92
Maize	96,283	2.10
Eleusine	254	0.01
Wheat	7,920	0.17
Rice	11,660	0.25
Sweet Potato	857,075	18.71
Irish Potato	276,061	6.03
Cassava	411,384	8.98
Taro	40,853	0.89
Yams	4,340	0.09
Vegetables	37,269	0.81
Fruits	58,759	1.28
Total	4,580,128	100

Source: MINAGRI, 1989.

III. Methodology

This study of the agribusiness sector in Rwanda will examine both the input and output marketing networks. Over the past decade, with deteriorating soil conditions and a decline in agricultural productivity, modern agricultural inputs--such as fertilizer and pesticides--were introduced in Rwanda to enhance productivity. Agricultural production, as noted earlier, largely stays on the farm for subsistence purposes. Aside from coffee and tea exports, non-traditional agricultural exports only emerged in the early 1990s. Given these conditions, it is not surprising that both the agricultural input and output networks in Rwanda are still in their early developing stages. Agricultural commodities are marketed through various channels by formal and informal agents, depending on the product. The rest of this study will document and analyze these marketing networks and the financial contracts facilitating these transactions.

1. Conceptual Framework

This systematic approach to the study of the financial networks servicing the agribusiness sector in Rwanda utilizes a modified subsector analysis. The subsector methodology entails the study of vertical linkages in the distribution of commodities among the different economic agents (Boomgard et al.). This includes an analysis of the role of the economic agents involved, the terms and conditions of their contracts and the linkages in their transactions. The analysis is further enhanced by examining the financial contracts that characterize the linkages in the distribution of commodities along the vertical channels. The incorporation of finance into this modified subsector framework allows for identifying the marketing and financial constraints that shape the development of efficient markets (Nagarajan and Meyer). Marketing mechanisms vary from spot markets, to contractual arrangements, to vertical integration. In addition to asset specificity and uncertainty of production, Nagarajan and Meyer propose incorporating financial and informational flows as endogenous determinants of the marketing mechanisms in a given subsector.[8]

2. Data Collection

Information used to analyze the structure of the existing input and output networks in the agribusiness sector in Rwanda were gathered during October-November, 1993. The survey of both input and output dealers involved interviewing the managers of institutions or the proprietors of enterprises responsible for all purchases and sales. Data collected during the interviews covered information on the general characteristics of the institution or enterprise, the nature of its trade, contractual relations with product suppliers, contractual relations with clients, information about financial contracts, and assets and liabilities of the enterprise. The data on financial contracts includes information about informal lending to suppliers and clients, institutional borrowing, deposits in institutions, informal borrowing from sources other than suppliers and clients, and deposits held in informal groups and with individual intermediaries.

By surveying all types of economic agents--public and private--involved in the marketing process within each subsector, a reliable data set was constructed to describe and analyze the existing marketing systems and associated financial contracts in the agribusiness sector. The input distribution network is developing at a slow pace in Rwanda as will be discussed in greater detail in the following section. This input distribution network involves three subgroups. The first group consists of the three parastatal institutions involved in the importation and sale of agricultural inputs in Rwanda. The second group is a sub-sample of four randomly selected private entrepreneurs dealing with the importation, wholesale and retail trade of agricultural inputs. The third group is made up of a random sample of five non-governmental organizations (NGOs) involved in input distribution, each with a different philosophy and operational system.

Output marketing networks are somewhat more developed than input supply channels in Rwanda. The domestic trading of agricultural products involves only one parastatal institution,

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[8] See Nagarajan and Meyer for details on the definitions of market mechanisms.

Output marketing networks are somewhat more developed than input supply channels in Rwanda. The domestic trading of agricultural products involves only one parastatal institution, a few cooperatives, and many private traders at the wholesale and retail levels. This survey of output dealers involved primarily two subgroups in addition to the parastatal institution and two randomly selected cooperatives. These subgroups involve a total of 21 randomly selected wholesalers, 15 retailers and one cooperative. It is important to note, however, that these entrepreneurs were chosen within the specific output subsectors considered in the study--dry beans, potatoes, tomatoes and green beans--for reasons that will be discussed below.

IV. Agricultural Input Networks

Government intervention in agricultural input marketing is pervasive in Rwanda. The use of modern agricultural inputs, mainly fertilizer and pesticides, was originally introduced under grants from donor countries, largely through parastatal institutions. Unfortunately, this has meant continued government control of all fertilizer imports benefiting from large subsidies provided by the donor community, mainly EEC funds. Decreased land-holdings have put greater emphasis on the need to use mineral fertilizer as organic fertilizer has become insufficient to maintain soil fertility (World Bank, 1991).

Most fertilizer that entered the Rwandan market in the 1980s was either provided through grants or purchased at subsidized prices, and handled by a division of the Ministry of Agriculture. As the demand for the use of agricultural chemicals grew (Table 12), the government in 1985 instituted a separate department, APNI (Appui au Programme National Intrants), primarily to handle fertilizer and pesticide imports. The principal function of the APNI is to purchase (import) and market (distribute) mineral fertilizer and pesticides in Rwanda. Two other large parastatal institutions also import fertilizer primarily for their outgrowers. The OCIR-CAFE (Office des Cultures Industrielles au Rwanda-Coffee) is a government department responsible for the marketing of coffee and the OCIR-THE (Office des Cultures Industrielles au Rwanda-Tea) is another government department that operates state-owned tea plantations, purchases tea from outgrowers, processes tea leaves and exports black tea.[9] Given the subsidy structure characteristic of these parastatal institutions, it is not possible for any private entrepreneur in Rwanda to compete to import fertilizer. The domestic distribution system of fertilizer, however, seems to be changing slowly as explained below. Figure 1 portrays the vertical and horizontal linkages among the numerous agents and institutions comprising the current agricultural input network and the financial transactions that accompany the physical transactions.

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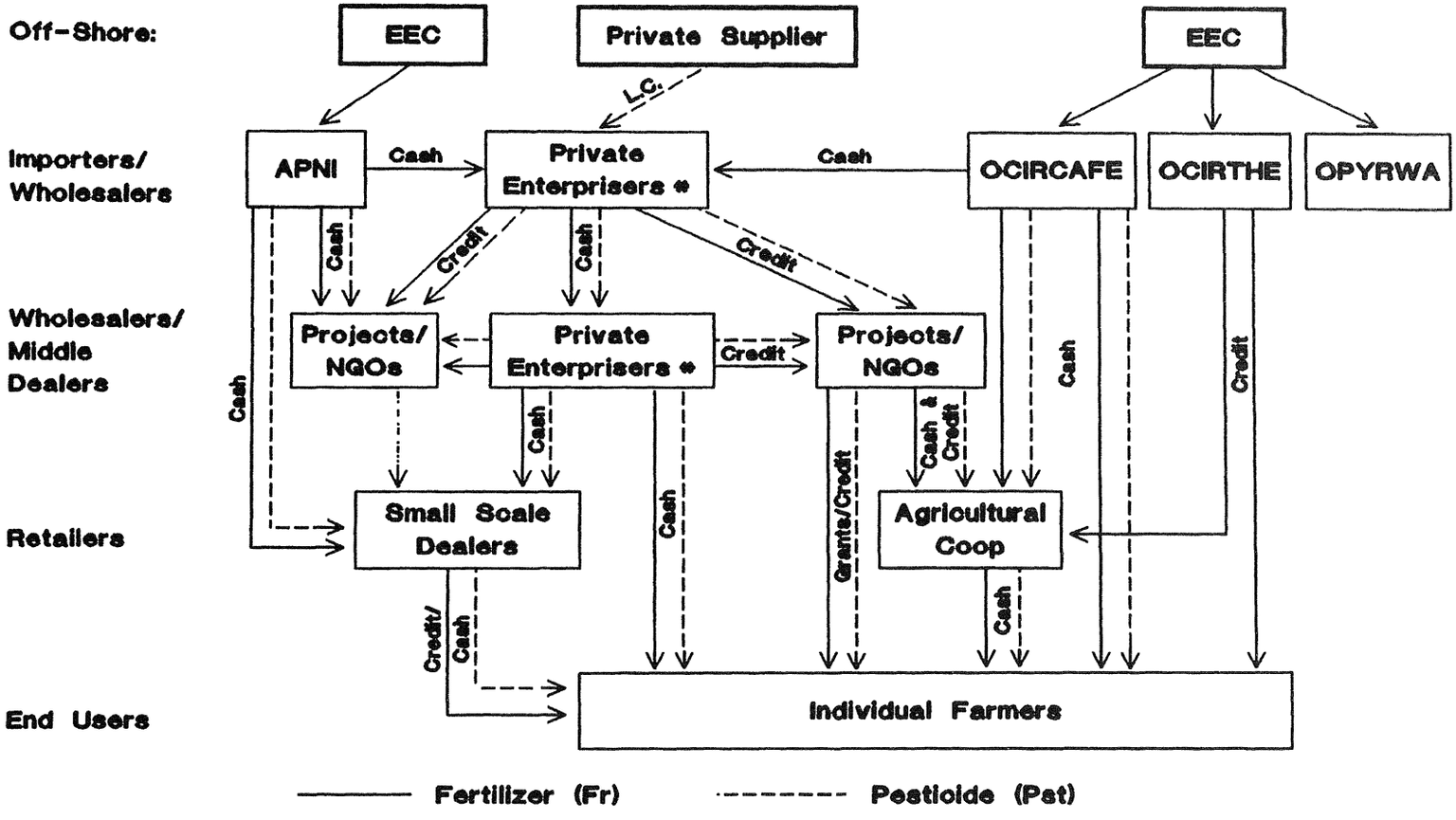
[9] A fourth parastatal institution OPYRWA (Office du Pyrethrum au Rwanda) also started importing small amounts of fertilizer for the production of pyrethrum which is grown for industrial use as a lubricating oil. Given that these imports are small, they were not reported in the total statistics from government sources.

Figure 1. Input Channels for the Distribution of Agricultural Inputs in Rwanda in 1993.



* AGROTECH, AGRIMAX, Private dealer

Table 12. Volume and Value of Fertilizer Imports in Rwanda: 1969-1993.

Year	Volume (Tons)	Value (1000 FRW)	Average price (FRW/kg.)
(1)	(2)	(3)	(4)[a]
1969	531	6525	12
1970	945	10371	11
1971	1,544	18114	12
1972	3,303	44167	13
1973	2,731	33803	12
1974	2,289	42576	19
1975	835	33167	40
1976	1,073	31369	29
1977	1,411	41700	30
1978	1,987	86871	44
1979	325	16436	51
1980	640	46892	73
1981	456	33914	74
1982	1,782	85049	48
1983	623	27803	45
1984	4,631	185710	40
1985	4,121	161366	39
1986	3,698	213911	58
1987	1,695	60639	36
1988	5,283	180066	34
1989	7,000	98918	38
1990	90	4568	51[b]
1991	7490	539,950	72[b]
1992	5693	740,817	130[b]
1993	17,500	n.a.	n.a

Source: BNR files; DSA, Etude sir l'Utilisation des Engrais Mineraux et des Pesticides au Rwanda, 1990.

[a] column (4) = column (3)/column (2)

[b] The high implicit prices estimated here for 1990-1993 (column 4) are unaccountably higher than the actual prices recorded in the markets during these years.

1. Input Agents

Fertilizer is sold at the wholesale level by the three parastatal institutions to different, although increasingly overlapping, clientele. The large pool of clients who purchase from APNI, OCIR-CAFE and OCIR-THE are private traders, non-governmental organizations,

agricultural cooperatives and farmers. Each institution and its system of operation will be discussed separately below. In addition to fertilizer, the APNI and OCIR-CAFE import pesticides. The importation of pesticides by these parastatal institutions, in contrast to fertilizer, is much less subsidized than fertilizer. Pesticides are imported and sold at close to world market prices. With a growing demand for pesticides (Table 13), this has allowed some private entrepreneurs to expand their activities and engage in importation and sales. Some of these entrepreneurs are the same dealers who purchase fertilizer from the parastatal institutions. Table 14 provides an account of the sample size, that is, the number of economic agents[10] interviewed in the study and the inputs they market in Rwanda.

Table 13. Volume and Value of Pesticide Imports in Rwanda: 1985-92.

Year	Volume (Tons)	Value (1000 FRW)
(1)	(2)	(3)
1985	1,800	159,414
1986	2,120	168,655
1987	1,979	160,535
1988	1,593	269,227
1989	2,291	268,806
1990	2,599	264,219
1991	2,320	372,266
1992	842	366,836

Source: BNR files; DSA, Etude sir l'Utilisation des Engrais Mineraux et des Pesticides au Rwanda, 1990.

[10] The term economic agents refers to parastatal institutions, private entrepreneurs and non-governmental institutions.

Table 14. Input Distribution Agents Sampled in Rwanda.

Agent	Type of Agent	Inputs	Trade Function
(1)	(2)	(3)	(4)
APNI	Parastatal	Fertilizer Pesticide	Importation & Wholesale
OCIR-CAFE	Parastatal	Fertilizer Pesticide	Importation & Wholesale
OCIR-THE	Parastatal	Fertilizer	Importation & Wholesale
AGROTECH	Private Co.	Fertilizer Pesticide	Wholesale & Retail; Importation, Wholesale & Retail
AGRIMAK	Private Co.	Fertilizer Pesticide	Wholesale & Retail
Entrepreneur	Private Enterprise	Fertilizer Pesticide	Wholesale & Retail
Entrepreneur	Private Enterprise	Fertilizer Pesticide	Retail
Projects	NGO	Fertilizer Pesticide	Retail; Grants

Source: OSU survey, 1993.

To fully describe the picture of the input distribution system, Figure 1 illustrates the major distribution channels for fertilizer and pesticides. The two agricultural inputs considered, fertilizer and pesticides, are analyzed from their sources of origin through the importation, wholesale and retail channels until they reach final users. Each level of input trading involves a mixed set of economic agents, each operating with a different "raison d'etre".

A. Import and Wholesale Distribution

Fertilizer is imported into Rwanda by the three parastatal institutions, APNI, OCIR-CAFE and OCIR-THE. All three benefitted this past year from an EEC subsidy that covered more than half the import cost of fertilizer and shipping costs to Rwanda. Previously, the APNI and OCIR-CAFE were the only recipients of this subsidy; however, in 1993 the OCIR-THE was able to benefit from EEC donor funds for the first time. The mechanism by which these institutions imported fertilizer in 1993, however, was the same.

The parastatal institutions each identify the type and amount of fertilizer they need for the following season. The EEC determines the amounts to be supplied and the list of countries from whom it is possible to import. These countries are EEC member countries and ACP (African-

Caribbean-Pacific) countries.[11] The parastatals order the fertilizer from overseas suppliers and negotiate their requests with the EEC. The data in Table 15 list the quantities of fertilizer requested and received by these institutions over the past three years. These data indicate that there has been no rationing in the amounts of fertilizer demanded. Suppliers ship the fertilizer to Rwanda and are paid in full directly by the EEC. Parastatal institutions in 1993 paid only about 46 percent of the total value and shipping cost of the fertilizer imported in Rwanda. The payments made by the APNI, OCIR-CAFE and OCIR-THE were paid through the respective parastatal accounts at the central bank (BNR) to an EEC development fund for Rwanda, also at the BNR. The average purchase price for these parastatal institutions was 35 FRW/kg.[12]

Table 15. Imports of Mineral Fertilizer in Rwanda by Parastatal Institutions (in tons): 1991-93.

Institution	1991		1992		1993	
	Demand	Supply	Demand	Supply	Demand	Supply
(1)	(2)	(3)	(4)	(5)	(6)	(7)
APNI	5180	5180	547	547	6000	6000
OCIR-THE	1560	1560	4099	4099	5500	5500
OCIR-CAFE	0	0	133	133	6000	6000
TOTAL	6740	6740	4778	4778	17,500	17,500

Source: APNI files, 1993.

Pesticides, in contrast to fertilizer, are imported by the parastatal institutions as well as by private entrepreneurs. This is possible because the subsidy at which these parastatals import pesticide is minimal. The overall price at which the APNI and OCIR-CAFE sell pesticides is close to the world market price which makes it feasible for private entrepreneurs to sell at comparable prices. The distribution techniques of fertilizer and pesticides by the various agents in the input system are, however, different.

a) APNI

APNI was established by the government of Rwanda in 1985 to deal with modern agricultural imports. Most of the fertilizer APNI sells has been purchased through the EEC subsidy; however, the APNI occasionally receives some grants particularly from Japan.[13] Importation of fertilizer by donor funds, discussed above, imposes a condition on fertilizer sales

[11] Typically fertilizer has been imported from Mauritius, Belgium, Germany and Holland.

[12] One U.S. dollar is currently equivalent to 146.6 Rwandan Franc (FRW).

[13] In 1993 APNI received only 200 tons of fertilizer as a grant from Japan.

Importation of fertilizer by donor funds, discussed above, imposes a condition on fertilizer sales in Rwanda. The APNI like other parastatal institutions sells fertilizer at a price fixed much lower than the world market prices. This has meant that over the past decade the average price for fertilizer in Rwanda was about 30-45 FRW/kg when international prices were closer to 60 FRW/kg.

The APNI is based in the capital, Kigali, and does not operate any sales outlets anywhere else in the country. All the sales are conducted in its government building where it has a limited storage capacity of about 1000 tons. Thus, even though it receives imports on average twice a year, there is a storage problem. About 60 to 70 percent of the imported fertilizer is sold to retailers and 30 to 40 percent to wholesalers. APNI sells in quantities of 20, 50 and 100 tons to small and large traders who come from all over the country as well as to many NGOs. The retail price for a purchase of 20 to 50 tons, ranged between 40-45 FRW/kg. The wholesale price for 100 tons and more was about 30 FRW/kg in 1993.

At least 50 percent of the fertilizer imported by APNI is sold to traders who in turn sell it in the northern part of the country. These sales are driven by the rapidly growing potato crop, which enjoys a much higher yield with applications of fertilizer and pesticides. Research results comparing the use of fertilizer and pesticides by potato growers in Rwanda, Burundi and Zaire found that in a study of about 350 farmers in Rwanda, about two thirds (70 percent) used chemical fertilizers and the vast majority (93 percent) used fungicides (PNAP, 1993). This marketing of fertilizer is carried out mostly by private entrepreneurs in the north.

All sales of fertilizer and pesticides made by the APNI are paid for in cash or by check. That is, there have been no credit sales by the APNI since 1991 when the institution experienced huge default problems from buyers. Given its state-enterprise status, the APNI was able to continue drawing on government funds and play a significant role in the distribution of fertilizer in the country despite these losses.

b) OCIR-CAFE

OCIR-CAFE was separated from OCIR--a parastatal institution that used to deal with both coffee and tea production--in 1974. As a public institution, its principal functions are the promotion of coffee production through the provision of modern agricultural inputs--such as fertilizer and pesticides--supervision, quality monitoring and marketing of coffee. OCIR-CAFE collects about 35,000 tons of arabica coffee per annum and sells it to RWANDEX, a private company which has a monopoly in coffee exports. OCIR-CAFE exports only about 600 tons of robusta coffee per annum through RWANDEX. OCIR-CAFE has been recently involved in the importation of fertilizer. The use of fertilizer was introduced in 1989 through a grant of 54 tons in an attempt to improve coffee production. In 1990-92 OCIR-CAFE did not engage in the importation of fertilizer; it purchased fertilizer from the APNI to distribute to its out-growers. In 1993, however, OCIR-CAFE reentered the distribution network and imported about 6,000 tons of fertilizer.

OCIR-CAFE has about 30 technicians in the field and 10 consultants to advise coffee outgrowers on the use of fertilizer. There are about 700,000 farmers who cultivate coffee in Rwanda and they typically purchased fertilizer through OCIR-CAFE agents in 20-50 kg. lots at 45 FRW/kg. In addition to selling fertilizer to coffee outgrowers through its agents, OCIR-CAFE auctioned off fertilizer to retailers and cooperatives in quantities of at least 50 ton lots at 40-45 FRW/kg. All sales were made in cash as OCIR-CAFE had also recorded huge defaults when offering credit to its clients in 1990-91.

OCIR-CAFE buys other inputs (sacks, metal filters, pesticide sprayers, etc.) in addition to chemical fertilizer to facilitate its marketing process and encourage good production. In 1993 OCIR-CAFE bought 400,000 sacks from RWANDAX and imported metal filters and spraying machines from Italy, Spain and France. The spraying machines were sold at a subsidized price of about 3,000 FRW to coffee outgrowers. OCIR-CAFE paid for these inputs using a letter of credit drawn at the BNR--for 1-3 months--where 30-80% of the total cost was paid by OCIR-CAFE. That is, OCIR-CAFE received a partial subsidy from the EEC for the purchase of inputs other than fertilizer.

c) OCIR-THE

OCIR-THE is a parastatal institution which is responsible for the development of tea production and exports in Rwanda. There are about 25,000 tea outgrowers who contribute about 55 percent of the total national tea production. In addition to providing assistance to tea outgrowers, OCIR-THE operates state-owned plantations--which contribute about 24 percent of national tea production, and has ten functioning tea factories in the country.[14] The remaining tea production is managed by agricultural cooperatives (15 percent) and a few large plantations (5 percent). The provision of assistance to tea outgrowers has mainly been in the form of fertilizer as tea production does not require the use of other modern agricultural inputs. The consumption of fertilizer in tea production is about 400 kg per hectare.

OCIR-THE has imported fertilizer regularly at world market prices since 1984. Typically, once the suppliers are identified, a letter of credit is issued by the Central Bank (BNR) and charged to OCIR-THE's account. Thus, OCIR-THE covered the total cost of the fertilizer imported until last year. In 1993, for the first time, OCIR-THE benefitted from the EEC subsidy on fertilizer imports. Like its sister parastatal institutions, OCIR-CAFE and APNI, OCIR-THE was responsible for only 46 percent of the total value of fertilizer imports in 1993. OCIR-THE paid for these imports similar to APNI and OCIR-CAFE as discussed above. Up to last year, OCIR-THE was able to pay world market prices for fertilizer imports by charging prices higher than the Rwandan market price, because it supplies fertilizer to tea outgrowers on credit. OCIR-THE, as a monopsonist for tea, ensures good repayment of its loans by being able to control the sale of output from the tea-outgrowers through its processing facilities.

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[14] OCIR-THE owns 17 tea factories in Rwanda; however, 7 of them were not in operation because they are located close to the northern borders where there was civil unrest.

The sale of fertilizer by OCIR-THE is provided on short-term credit only to small landholders and cooperatives. These in-kind loans cover the total value of fertilizer sold to farmers at production time at zero explicit interest rates. These loans are due at harvest when OCIR-THE collects payments in-kind in the form of tea. The loan contract on average covers the price of 45 kg per farmer given at the price that OCIR-THE purchases fertilizer plus transportation costs to the farm gate. As mentioned above, OCIR-THE has a monopsony on the purchase of tea from its outgrowers. Typically, OCIR-THE purchases tea from farmers at the farm gate and deducts the total value of the fertilizer loan from the price of output. Not surprisingly, the repayment rate on the fertilizer credit scheme was reported to be very good.

d) Private entrepreneurs

All fertilizer imports are controlled by parastatal institutions. The private sector plays no role at the import level (Figure 1). Pesticides, however, are imported by a few private entrepreneurs in the country in addition to the imports by APNI and OCIR-CAFE. Pesticides are imported from Europe, Mauritius, Pakistan and Kenya. The demand for pesticides has been increasing in the past few years. Thus, although the parastatal institutions receive a small subsidy from the EEC, private entrepreneurs have been able to compete in this market.

Pesticides are imported by private entrepreneurs using letters of credit from one of the domestic commercial banks where they are regular customers. The letters of credit are typically for one to three months, granted at the on-going rate of interest with additional fee charges for the provision of this instrument. The same entrepreneurs, unable to compete with the subsidized import price of fertilizer, purchase fertilizer in wholesale, at about 32 FRW/kg, mostly from APNI in cash. Thus, as discussed earlier, there is no trade credit, advance payment or consignment in the sale of fertilizer by the parastatal institutions, except by OCIR-THE which sells only to tea outgrowers.

Pesticides and fertilizer are bought and sold in both wholesale and retail by private entrepreneurs (Figure 1). Three private traders who were involved in wholesale and retail marketing of both fertilizer and pesticides were interviewed in this study. Some selected characteristics of their business activities are discussed in Table 16. These traders have been involved in the sale of modern agricultural inputs for only two to four years. This is not surprising considering that the increased demand for both inputs evolved largely during the past few years. Most of these traders, however, have been in the private sector for a longer time and were involved in the marketing of other commodities. The volume of fertilizer handled by the individual trader ranged between 90 and 560 tons in the past year.[15]

[15] It is difficult to document the volume of pesticides traded because of the mixed forms and measurements in which pesticides are traded.

Table 16. Selected Characteristics of Modern Agricultural Input Dealers (Importers and Wholesalers) in Rwanda.

Selected Characteristics	Relevant Indicators
Total number of traders interviewed	3
Ave. number of years in input distribution	3
Ave. volume of fertilizer traded per year	300 Tons
Typical clients	Retailers & NGOs
Second business	Yes
Purchase price of fertilizer	32-35 FRW/kg
Form of purchase payment:	
Fertilizers	All cash
Pesticides	Cash and letters of credit
Sale price of fertilizer:	
Wholesale	38-42 FRW/kg
Retail	45-48 FRW/kg
Form of payment by buyers:	
Retailers	Mostly cash
NGOs	Mostly credit
Length of trade credit contracts	1-12 weeks
Interest charges received	0-30 percent
Volume of credit transaction	1-80 tons of fertilizer
Collateral	None; confidence

Source: OSU survey, 1993.

Wholesale marketing typically involves a small discount in price because of the reduced transaction costs and scale economies enjoyed by the suppliers. The wholesale price of fertilizer for sales of at least one ton was 38 FRW/kg; the wholesale price for smaller amounts of at least 50 kg was 40 FRW/kg; and the retail price was about 45 FRW/kg for 1993. All wholesale and retail sales of both pesticides and fertilizer were reported to be in cash by the three private traders. The only exception was trade credit provided to NGOs. Traders considered NGOs a low risk group because they are supported by international organizations and, thus, are associated with minimal to no probability of loan default. Sales on credit to NGOs required no collateral; however, these contracts were reported by one entrepreneur to involve a mark-up in price which could reach as much as 30 percent. This is because such sales involve additional costs associated with giving a one to three months zero explicit interest supplier loan. The

wholesaling of fertilizer and pesticide did not involve any advance payments or sales on consignment for any of the cases discussed here.

All three traders reported giving their employees advances on their salaries and only occasionally a loan to a friend. In addition, all three reported holding deposit accounts with one or more of the domestic commercial banks. As noted earlier, one of the traders who imports pesticides usually draws on a letter of credit from the Banque de Kigali (BK). Moreover, the other two traders have gained access to formal bank credit in the past three years. These loans were both medium-term, i.e. ranging between one and three years, at the on-going interest rate--which is barely positive in real terms--and typically involved a title deed as collateral. Only one of these traders reported taking a very short-term informal loan from another trader during the past year. Finally, none of these traders were involved in Rotating Saving and Credit Associations (RoSCAs) known as tontines in Francophone Africa.

B. Retail

The parastatal institutions, OCIR-CAFE and OCIR-THE, retail modern agricultural inputs to their small scale outgrowers, as discussed above. This satisfies a large part of the demand for these inputs through the traditional supply leading channels. The other types of economic agents involved in the retail distribution network are private entrepreneurs, NGOs and agricultural cooperatives.

a) Private entrepreneurs

Private entrepreneurs have emerged in the past few years to play a role in the retailing of modern agricultural inputs. In addition to the three wholesalers discussed in the previous section, who sell both wholesale and retail, a fourth trader who is essentially a small retailer in rural areas was interviewed for this study. Like his fellow entrepreneurs, this trader has been involved in commerce for a long time but engaged in the distribution of fertilizer and pesticides only for the past two years. This trader reported purchasing a total of about 10 tons of fertilizer over the past year from a wholesaler in one of the secondary towns. Roughly half the weekly purchases he makes are on credit. This trade credit facility is offered on a weekly basis covering 60 percent of the total value of his purchases. On average he purchases about 200 kg of fertilizer per week at 44 FRW/kg which was reported to be the market price. There were no implicit interest charges reported and no collateral required by the wholesaler.

The principal clients of this retailer are farmers. Unlike the wholesalers who also sell in retail markets, this retailer reported selling some fertilizer to farmers on credit. This represented about 35 percent of his sales with the other 65 percent in cash. The retail price reported was about 47 FRW/kg for both cash and credit sales since credit was given only for one week covering about half of the 15-30 kg sale transaction per customer. Since the retailer trusted his customers, no collateral was required. There were no sales made with advance payments or on consignment. This trader has never requested any formal loan from a commercial bank although he reported holding deposit accounts with two financial institutions.

However, short-term informal loans among fellow traders seem to be a common practice which is reciprocated among entrepreneurs at the same level of trade. Finally, this retailer reported having no interest in participating in RoSCAs.

b) Non-government organizations

Non-governmental organizations have become a popular conduit for donor assistance in the 1990s. Rwanda, like many other developing countries, has its share of NGOs operating in most sectors of the economy each with its own approach. Four of these organizations were visited in Rwanda to identify the role they play in the marketing of modern agricultural inputs. NGOs are involved mainly at the wholesale and retail levels of fertilizer distribution (Figure 1). The method of operation utilized by each of these organizations are reviewed briefly.

i. PNAP

The Programme National de la Pomme de Terre (PNAP) is a research institution whose principal function is the development of potato production in Rwanda, Zaire and Uganda. The center aids in improving and disseminating new technologies for improving the quality of production. The regional office which extends services to these three countries is located in Ruhengeri in northern Rwanda which is close to the borders with these countries. The high ground plateaus and mountains in the region is also where potatoes are grown. Potato production will be discussed in more detail later.

The PNAP purchases modern agricultural inputs, both fertilizer and pesticides, mainly for its own use in research. However, the PNAP has assisted in the development of farmers' awareness concerning the advantages of using fertilizer and pesticides in potato production. Table 17 reports the PNAP data which show a significant improvement in yields as a result of the use of modern agricultural inputs. These figures imply almost a five fold increase in yield as a result of the use of fertilizers and pesticides. To encourage farmers to use these inputs, the PNAP engages in limited purchases of fertilizer and pesticides on behalf of some groups of farmers in the north. In these cases, the PNAP requests advance payments at the time of making orders and then purchases these inputs for the farmers.

Table 17. Potato Yields With and Without Modern Inputs.

Production technique:	Yield per hectare
No modern inputs	3-4 Tons
With organic fertilizer only	5-6 Tons
With mineral fertilizer only	6 Tons
With pesticides only	12 Tons
With mineral fertilizer and fungicide only	20 Tons
With mineral fertilizer, fungicide and improved varieties	25 Tons

Source: PNAP, 1993.

ii. Projet Loiret

Projet Loiret is a French NGO operating in Butare in the southern part of Rwanda. We discuss the operations of this project in more detail in the non-traditional export section. However, this organization is also involved in the distribution of fertilizer and pesticides to its outgrowers of french beans and food crops. The project primarily promotes the production of french green beans for export to France. In the low-lands (marais) where green beans are grown, farmers also grow other domestic crops such as maize, cassava, dry beans, etc. Project Loiret provides modern inputs on credit to farmers growing domestically consumed crops but offers these inputs as grants to green bean outgrowers. Farmers producing green beans, however, are under a moral obligation to sell their produce to the project. Even if french bean farmers grow domestic crops, they are expected to repay the in-kind fertilizer and pesticide loans received for the production of domestic crops. In light of this confusing mix of in-kind grants and credit to the same producers, it is not surprising that this project has had many default problems with its in-kind loans.

iii. UOM

The "Unite Operationnelle de Masaka" (UOM) is a project initiated in 1982 that has been managed by the Mission Francaise de Cooperation. The principal function of this NGO is rural development. In an attempt to assist agricultural development, the project distributed modern inputs in 1990 to about 58 farmer groups formed by the project. The UOM purchased these inputs from the APNI and other private entrepreneurs in cash, using a revolving fund operated by the Mission Francaise de Cooperation. The project distributed these inputs on credit to the groups. In-kind credit was extended to the groups for one month. The inputs were stored in a shop run by an elected manager and sold in cash to farmers in the region. The project recorded poor repayment for inputs distributed on credit not because of farmer default--since they purchased fertilizer in cash--but due to embezzlement of farmer cash payments by managers and cashiers in the UOM stores.

iv. IWACU

The "Centre de Formation et de Recherche Cooperatives IWACU" is a Swiss funded NGO, established in 1983, whose primary function is the provision of assistance to cooperatives in Rwanda. The principal types of assistance are training and consulting services provided to cooperative members. From 1986 through 1989, the IWACU was involved in the distribution of modern agricultural inputs, mainly fertilizer, through credit to agricultural cooperatives. The project, not surprisingly, experienced major default problems which led to its termination. Currently, the IWACU plays the role of brokering information to facilitate the purchase of modern inputs by cooperatives. This occurs when cooperatives sell their produce in Kigali and the IWACU assists them in purchasing fertilizer. This system does not involve the IWACU financing of these cooperatives; however, information provided by IWACU encourages the use of modern agricultural inputs.

c) Agricultural cooperatives

Agricultural cooperatives are very popular in Rwanda. Cooperatives sell modern inputs to farmers only at the retail level. The structural organization of cooperatives and their portfolios, however, differ. Some cooperatives purchase and sell inputs, while others sell their output and/or cultivate land collectively. The sale of modern inputs by cooperatives may be offered only to cooperative members or to the general public. In either case, the cooperatives benefit from subsidized wholesale prices when they purchase fertilizer in bulk and they make profits if they sell to the public at higher retail prices. One of the cooperatives that was interviewed in the survey indicated that it purchased fertilizer and pesticides from one of the private wholesalers in Kigali at the wholesale price. Cooperatives also receive subsidized prices for inputs from parastatal institutions such as OCIR-CAFE and OCIR-THE when they grow coffee and tea, respectively, on communal land.

2. Financial Contracts

Financial contracts that characterize the flow of commodities in the input channels are thin. At the importation level, the parastatal institutions make payments directly from their respective accounts at the BNR to a development fund sponsored by the EEC. Private entrepreneurs, however, who engage in the importation of pesticides use the typical letter of credit which is drawn at a domestic commercial bank. At the wholesale level, all parastatal institutions sell in cash to all types of clients except for OCIR-THE which sells fertilizer on credit to its outgrowers.

Private entrepreneurs also sell in cash to most of their clients, both at the wholesale and retail levels, except for NGOs. Wholesalers sell modern inputs to NGOs on credit since they are considered reliable customers with an international donor guarantee. Finally at the retail level, most sales are in cash. Many NGOs, however, utilize different approaches to assist their clients resulting in confusing array of mechanisms in the sale of inputs. Some NGOs sell inputs

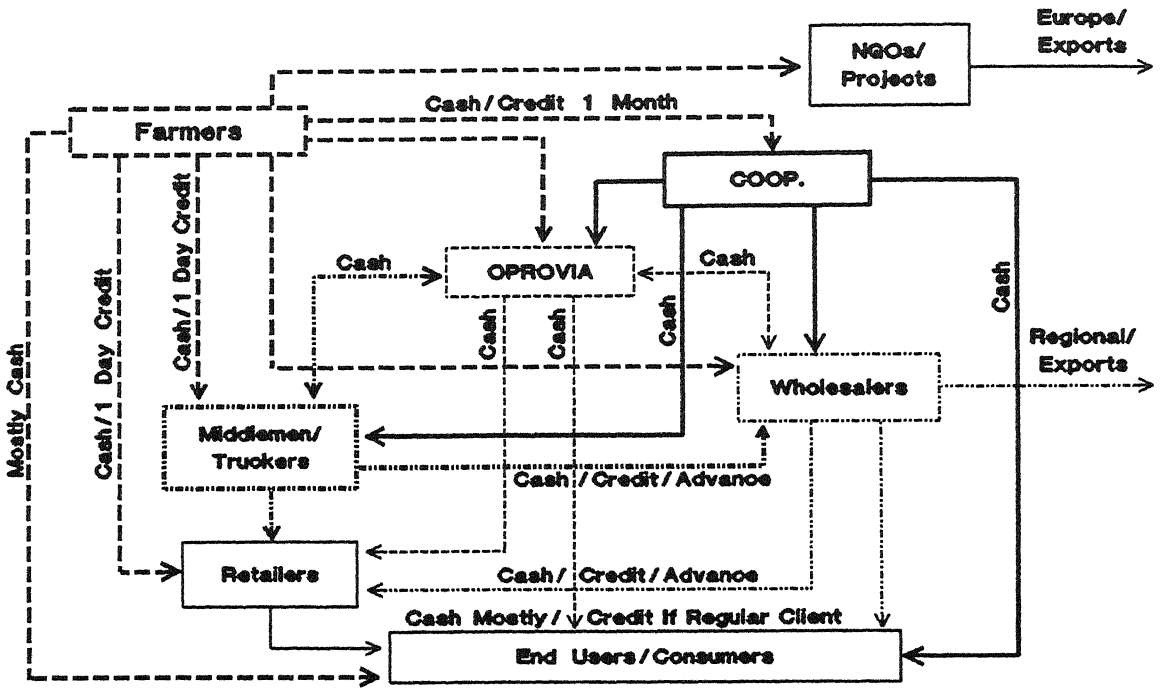
at different prices in cash, while others offer credit; still others take advance payments, and not surprisingly others provide grants to their cooperative or farmer clienteles.

V. Agricultural Output Networks

Rwanda was one of the few food self-sufficient countries in Sub-Saharan Africa during the past decade. This self-sufficiency was actually maintained by the 90 percent of the Rwandan people who live in rural areas and engage in agriculture with a strong subsistence bias. Hence, a large proportion of agricultural output was never marketed. This scenario has changed slightly over the past few years. Rwanda is not as self-sufficient now because population growth has been increasing. However, 90 percent of the Rwandan people continue to reside in rural areas and market only a small portion of their output. A recent study estimates the degree of commercialization of the 12 most important agricultural products in Rwanda (Loveridge, 1992). Among unprocessed products, about 35 percent of total potato production is sold, which makes it the most commercialized food crop in the country. However, given that Rwanda is least self-sufficient in dry beans, the demand for bean imports induces an active trade in this crop. Only 77 percent of the dry beans consumed in Rwanda are locally produced (Loveridge, 1992). Dry beans and potatoes are, therefore, among the most dynamic output subsectors in terms of trading activities. Both crops are classified as semi-perishables.

Among the perishable crops fresh fruits and vegetables represent only two percent of the total volume of agricultural production (Table 11). These crops, however, represent a potential for export diversification, especially considering demand in European winter markets. Therefore, an examination of the marketing of these crops is strategic to the development of the agribusiness sector in Rwanda. Figure 2 lays out the vertical and horizontal linkages comprising the financial flows and marketing network for agricultural products in Rwanda.

Figure 2. Output Channels for the Distribution of Agricultural Output in Rwanda in 1993.



1. Output Agents

Our study of the distribution of outputs through alternative channels is based on the same subsector methodology outlined earlier. Output networks, contrary to input channels, are more dependent on the specific subsector or product rather than the type of economic agent or institution handling the sale of these products. The following sections deal with the marketing of four crops: dry beans, potatoes, tomatoes and green beans. The various economic agents involved in the marketing of these commodities are identified in Figure 2. The production units are primarily the small-holder farmers and agricultural cooperatives; the marketing agents are wholesalers, middlemen/truckers, a parastatal institution which also sells in retail markets; and finally the retailers who sell directly to consumers. Some of these agents are more active in certain subsectors than others which will be attributed to a number of factors in subsequent discussions. Table 18 details the types of agents involved in the output marketing network, their suppliers and customers by subsector.

Table 18. Agricultural Output Agents Sampled in Selected Subsectors in Rwanda.

Subsector	Agent	Type	Sample Size	Suppliers	Customers
(1)	(2)	(3)	(4)	(5)	(6)
I) Dry Beans	a) OPROVIA	Parastatal	1	Wholesalers	Public sector
				Truckers	Wholesalers
				Farmers	Retailers
	b) Wholesalers	Private	10	Truckers	Retailers
				Farmers	Consumers
				OPROVIA	
II) Potatoes	a) OPROVIA	Parastatal	1	Truckers	Retailers
				Farmers	Consumers
	b) Wholesalers	Private	6	Truckers	Retailers
				Farmers	Consumers
III) Perishable Fruits & Vegetables	a) Truckers	Private	4	Farmers	Retailers
	b) Retailers	Private	15	Truckers	Consumers
				Farmers	
	c) Cooperative	Private	1	Farmer-members	Consumers

Source: OSU survey, 1993.

A. OPROVIA

OPROVIA (Office pour la Commercialisation des Produits Viviers, des Intrants Agricoles et des Production Animales au Rwanda) is a public institution that was established in 1975. It is the only parastatal institution that deals with the marketing of agricultural products and occasionally the distribution of agricultural inputs. The distribution of agricultural inputs was carried out in some years in conjunction with APNI. OPROVIA, however, did not engage in the downstream distribution of modern agricultural inputs during 1993 since there was competition by the private sector.

OPROVIA is involved mainly in the marketing of non-perishable food products and semi-perishable crops. The non-perishable food products, such as flour, rice and cooking oil, are imported and sold in both the wholesale and retail markets. The second category of semi-perishable crops, such as dry beans, potatoes and sorghum, are purchased from wholesalers, middlemen or directly from farmers.

There are three harvest periods for dry beans in Rwanda. The first and largest harvest is in January-February which comprises about 75 percent of the total national production; the second, medium sized harvest occurs in June-July which comprises about 20 percent of the total production; and the third and smallest harvest is spread throughout the year in the marais (i.e. drained wetland valleys) which comprise only five percent of the total production. OPROVIA purchases dry beans generally during the first harvest. The annual purchases by OPROVIA total between 3,500 and 4,500 tons. This varies depending on the total volume of the harvest and the storage capacity available at OPROVIA's facilities.

The principal suppliers of OPROVIA (80 percent) are the private middlemen/ truckers who purchase from farmers for sales to OPROVIA and other wholesalers. OPROVIA buys about 20 percent of its stock directly from farmers and occasionally from wholesalers. Purchases are made at 15 field offices that OPROVIA operates throughout the country. All purchases made by OPROVIA were reported to be paid for in cash or by check. Suppliers who sell to OPROVIA, however, reported that in some cases they received payments a month after delivery of their crops. This implies that OPROVIA receives some short-term trade credit from its suppliers. The average purchase price was reported to be 35 FRW/kg but varied between 30-37 FRW/kg.

OPROVIA sells mostly (75 percent) at the wholesale level to public service institutions, such as the army, prisons, hospitals, and schools. Sales to the general public are made in both wholesale and retail markets. The mode of payment by the general public is always cash. Public institutions, however, are typically billed which involves up to a one month lag to consummate payments. Sale prices vary depending on supplies in the market. In 1993, when supplies were short for a period of time, OPROVIA reported selling dry beans for 65 FRW/kg--previously purchased at 35 FRW/kg--at the time when the market price was 80 FRW/kg. Typically, OPROVIA's retail prices are 10 percent higher than its wholesale prices.

OPROVIA has been involved in the marketing of potatoes since 1988. The total volume of potatoes that OPROVIA stocks and trades is about 750 tons per annum. The potatoes are purchased mostly from the northern part of country (Gisenyi and Ruhengeri regions) where potatoes are grown and the sales are concentrated in Kigali. Potatoes are purchased mostly from farmers and cooperatives at about 14 FRW/kg. Sales occur almost exclusively in retail consumer markets at about 18 FRW/kg. Prices, however, vary depending on the season. OPROVIA reported purchasing potatoes from truckers and farmers in cash and selling to consumers only in cash.

B. Wholesalers

Wholesalers are at the junction of the marketing channel that links producers and consumers. They are typically traders who operate small scale enterprises, own or rent a store, hire a few employees--either on a permanent or temporary basis--and engage in the trade of one or more lines of products. There is another type of small wholesaler, who operates in some cases between farmers and the store-wholesalers. These are the middlemen/truckers, i.e. traders

who basically purchase products from farmers and deliver them to wholesalers in fixed locations or to retailers. Often the degree to which one type of agent dominates the marketing channel is explained by the subsector, i.e. the type of crop in question and the size of total production. Hence, the following subsections will discuss each group of wholesalers by the major type of product they trade.

a) Dry beans

Dry beans are a major staple in the Rwandan diet. Private wholesalers are the agents who play a dominant role in this market. They are typically proprietors of small scale enterprises. Ten entrepreneurs in this group were interviewed to gather data on the nature of their operation, their contracts with their suppliers and customers, and the nature of the financial services they use. Table 19 presents data that describes this group of entrepreneurs and the nature of their contracts.

Most traders in the sample have been involved in marketing dry beans from 2 to 15 years (8 years on average). These traders are all proprietors of their small scale businesses where they hire on average five employees, including both full and part-time. Sixty percent of this group rent their stores and 70 percent own at least one truck which they use for transporting commodities.

Farmers, truckers and occasionally OPROVIA are the principal suppliers for dry bean wholesalers. Domestic production, however, is insufficient as mentioned above. Thus, regional imports mainly from Zaire are one of the supply sources transported by truckers. As expected, the purchase price from the farm gate was lower than the price offered by truckers; however, the price offered by Zairian truckers was more competitive than the domestic price.[16] Traders typically purchase dry beans about three times per week. The volume handled by these traders vary from 20 to 80 tons per month. This depends on the amount of storage space available to the trader. The majority of purchases were reported to be in cash; however, most traders (70 percent) reported gaining access to trade credit occasionally from their suppliers to finance a small portion (about 10 percent) of their purchases.

Trade credit contracts are typically short-term, small sized loans, with no reported interest charges or price mark-ups. They are often given with no collateral, or against post-dated checks and, in some cases, involve a signed contract between traders. In short, the average loan size covers about 4 tons of output, is extended for an average of 3 days and paid largely in full at maturity. A few traders also reported giving advances to their suppliers especially between harvests to guarantee access to produce. These contracts also include a small

[16] It was difficult to determine the exact price at which commodities were traded throughout the year, given the price fluctuations especially for dry beans. However, the price range was between 40 and 70 FRW/Kg. The reported price offered by Zairian truckers was 38 FRW/Kg.

advance covering a few tons of produce, given for a very short-term, on average 3 days, and typically with no guarantee.

Table 19. Selected Characteristics of Dry Beans Wholesalers in Rwanda.

Selected Characteristics	Relevant Indicators
Sample Size	10
Ave. number of years of experience	8 years
Owner of a store	40%
Owner of a vehicle	70%
Ave. number of employees	5
Types of suppliers	Truckers; Farmers; OPROVIA
Ave. frequency of purchase	3 times/week
Ave. volume of stock	20-80 tons/month
Price range	38-70 FRW/kg
Form of payment	Cash: (90%) Credit: (10%) Advance payment: occasionally between harvests
Characteristics of purchase credit contract	Ave. size: 4 tons; Length: 3 days; Interest Charges: 0%; Collateral: post-dated check or none.
Type of customers	Retailers: (80%) Consumers: (20%)
Price	40-70 FRW/kg
Form of payment	Cash, credit or advance payments
Characteristics of sale credit contracts	Ave. size: 4 tons; Length: 3-7 days; Interest Charges: 0%; Collateral: post-dated cheque or none.
Gives informal loans	80%
Receives informal loans	80%
Received a formal loan	50%
Holds deposit account	100%
Participates in Tontines	30%

Source: OSU survey, 1993.

Wholesale traders sell in large part to retailers (almost 80 percent), to consumers, and occasionally to OPROVIA. Prices were reported to vary between 40 and 70 FRW/kg depending

on the season. Most sales are made in cash; however, trade credit is granted on occasion to trustworthy clients. These credit contracts were reported to be given on average twice per month, covering about 4 tons of produce, maturing in one week at which time the balance (50-100 percent) is due. Advance payments were also reported to be made occasionally by some customers typically for one to two days covering about 50 percent of the total value of the contract.

Financial contracts in which wholesalers were engaged were not principally made up of the limited trade credit they demanded and/or supplied. In fact, this type of financial instrument seems to represent a smaller portion of the overall financial services wholesalers utilize. Other types of financial contracts that wholesalers reported using include receiving and offering informal loans from and to other traders, formal loans from commercial banks, and participation in tontines. Informal loans are a popular source of short-term finance used by the majority (80 percent) of the wholesalers in the sample. The amount of these loans varied from 30,000 to 1,000,000 FRW, given for periods ranging from a few days to three months, with no interest charges or collateral requirements. The demand for and supply of these informal loans was based on reciprocity between traders. Informal loans, however, are not the only type of informal finance that traders used in addition to trade loans. The Rotating Savings and Credit Associations (RoSCAs) are widely used by only some of these traders (30 percent). The tontines included a mixed gender membership in two out of the four tontines documented among these wholesalers. Contributions were made on a weekly or monthly basis. Weekly contributions ranged from 3,000 FRW to 5,000 FRW and monthly contributions ranged from 1,200 FRW to 6,000 FRW.

Wholesalers were also active customers of formal financial institutions. All the traders in this sample hold deposit accounts with at least one of the commercial banks in the country. Thus, it is not surprising to find that about half have demanded and gained access to formal loans in the past few years. These loans varied from 200,000 to 4,000,000 FRW all granted for a period of one year, at the current nominal interest (11-15 percent), and all secured by property collateral. Wholesalers, therefore, seem to be quite active in accessing various formal and informal financial contracts. What seems more atypical of this group of traders in Rwanda, compared to traders elsewhere, is the limited amounts of trade credit they receive from their suppliers and grant to their customers.

b) Potatoes

The rapid increase in potato production in Rwanda in the past few years has contributed to an expansion in the marketing network servicing this crop. The enhanced potato yields resulting from the increased use of modern inputs in rich volcanic soils has permitted exports to neighboring countries. These factors present a promising potential for the promotion of regional exports versus concentrating efforts on exports to the European market. The marketing of potatoes is conducted largely by private entrepreneurs. OPROVIA, as discussed earlier, plays a minor role in the sale of potatoes to consumers in Kigali.

Table 20. Selected Characteristics of Potato Wholesalers in Rwanda.

Selected Characteristics	Relevant Indicators
Sample Size	6
Number of years of experience	3 - 20 years
Owner of a store	50%
Owner of a vehicle	100%
Ave. number of employees	4
Types of suppliers	Truckers; Farmers
Frequency of purchase	3 times/week
Ave. volume of each purchase	66 tons/month
Price range	18-23 FRW/kg
Form of payment	Cash; Credit; Advance payments
Characteristics of purchase credit contract	Ave. size: 2 tons; Length: 2-7 days; Interest Charges: 0%; Collateral: none.
Type of customers	Retailers: 80% Consumers: 20%
Price	18-24 FRW/kg
Form of payment	Cash; Credit; Advance payments
Characteristics of sale credit contract	Ave. size: 2 tons; Length: 7 days; Interest Charges: 0%; Collateral: none.
Gives informal loans	100%
Receives informal loans	100%
Received a formal loan	60%
Holds deposit account	83%
Participates in Tontines	30%

Source: OSU survey, 1993.

Wholesale activities originate from Ruhengeri, in the northern part of the country, where traders purchase potatoes from farmers. The market for potatoes, however, has been growing and expanding from Rwanda to Burundi, Uganda and Zaire. Potatoes are often sold by wholesalers in both small wholesale and retail markets. Wholesalers, therefore, are the principal agents in the marketing of this crop. One of the largest potato growers in the north is also the principal wholesale distributor of fertilizer in the region. Six potato wholesalers were

interviewed in our study. The data presented in Table 20 describes the nature of these operations and the contracts that the potato wholesalers utilize in their transactions.

Wholesalers seem to have emerged recently in this subsector as trading in potatoes became increasingly attractive. The number of years that entrepreneurs have engaged in this activity range from 3 to 20, indicating the more recent entrants versus the incumbents in the market. These entrepreneurs are all proprietors, who own large trucks for transporting goods, with 50 percent owning the stores where they purchase and sell their stock, and hire 4 employees on average.

The principal suppliers of potatoes are farmers and middlemen traders (truckers). All the wholesalers in the sample reported purchasing stocks from both types of suppliers. The prices at the farm gate (roughly 18 FRW/kg) were lower than those offered by the truckers (20-23 FRW/kg). Given the semi-perishability of potatoes, wholesalers made purchases of about 66 tons, on average three times per week. Payments were made mostly in cash. Only one third of these traders reported access to trade credit from their suppliers. These contracts were similar to the occasional trade credit documented among the dry bean wholesalers. They typically cover only a small amount of produce (12 tons on average), given for a short period of time (2 to 7 days), with a 50 to 80 percent down payment and no collateral. Occasional advance payments were made to farmers by these wholesalers to guarantee access to stocks during deficit seasons.

Wholesalers sell in large part to retailers (80 percent) and directly to consumers. Sale prices were reported to vary, depending on the season, between 18 and 24 FRW/kg. The majority of sales (80 percent) were in cash. Occasional trade credit (1-2 contracts/month), however, was given to trustworthy retailers as reported by some wholesalers (60 percent). These contracts are again short term (one week on average), covering about 2 tons of produce, given with a 50 percent down payment and no collateral. Advance payments were also reported by two traders. These involved occasional contracts--once or twice per month--with 50 to 100 percent down payment for 1 to 2 days.

Reciprocal informal loans were reported by all traders in the sample. These loans ranged from 20,000 to 250,000 FRW given for a few days with no interest charges or collateral. Informal financial contracts in the form of RoSCAs were also reported to be a source of financing business activities among this group of wholesalers. Thirty percent of these traders reported participating in tontines where the majority of members are men, and contributions range between 7,000 FRW per month or 1,100 FRW per week. Formal financial services were also used by these wholesalers. The majority (83 percent) reported holding deposits at formal financial institutions. More than half of this group of traders (60 percent) reported receiving formal loans from domestic commercial banks to finance their operations. These loans varied from 1 to 6 million FRW, given for periods of 1 to 3 years at interest rates varying from 10 to 15 percent and secured by a title to real estate.

c) Perishable Fruits and Vegetables

The major perishable fruits and vegetables analyzed in this study that are traded in wholesale markets are tomatoes and bananas. Four economic agents who trade in these crops were interviewed in the survey (Table 21). One of the units is an association of 22 traders who operate as a cooperative and sell tomatoes wholesale. The wholesalers discussed in this sub-sector are truckers who purchase and sell stocks directly from their vehicles. This practice is explained by the degree of perishability of the crops in question. Given the lack of refrigeration facilities, there are no wholesalers who store fresh fruits and vegetables in shops. Bananas are sometimes harvested green and stored by microentrepreneurs for future use in processing banana beer. The time of the survey, however, coincided with the growing period between banana harvests when trading activity was minimal.

None of the tomato or banana wholesalers owned the trucks used for their trading activities and none employed permanent labor. They all purchased directly from farmers on a daily basis, stored the products on the truck overnight and sold them to retailers in the market the following day. The average quantity purchased by these wholesalers was 2 tons per day which they paid for largely in cash. Occasional trade credit (i.e. consignment of produce without payment) was provided by farmers for a part of the contract until the following day if the traders were short of cash. No advance payment (i.e. forward contracting) was reported by these traders to secure access to produce.

Wholesalers sell to retailers in the market at sunrise before consumers arrive to purchase their fruits and vegetables. Sales are mostly in cash; however, truckers supply some trade credit (10 to 15 percent of total sales) to their customers. These contracts cover very small quantities of produce, with about 25 to 50 percent of the total value of the contract given as a down payment and the balance completed the next day. No interest charges, or price mark-ups, were reported with the provision of these contracts, and no collateral was required.

Table 21. Selected Characteristics of Perishable Fruits and Vegetable[a] Wholesalers in Rwanda.

Selected Characteristics	Relevant Indicators
Sample Size	4
Owner of a store	None
Owner of a vehicle	None
Ave. number of employees	None
Types of suppliers	Farmers
Frequency of purchase	Daily
Ave. volume of stock	2 tons/day
Form of payment	Cash; Credit
Characteristics of purchase credit contract	Length: 1 day; Interest Charges: 0; Collateral: none
Type of customers	Retailers
Form of payment	Cash; Credit
Characteristics of sale credit contract	Length: 1 day; Down payment: 25-50% Interest Charges: 0; Collateral: none
Gives informal loans	75%
Receives informal loans	75%
Received a formal loan	50%
Holds deposit account	75%
Participates in Tontines	75%

Source: OSU survey, 1993.

[a] The perishable fruits and vegetables traded in wholesale and discussed in this study are tomatoes and bananas.

This group of wholesalers, in contrast to the larger and more established wholesalers who deal in semi-perishables, utilize few formal financial services. On the one hand, only 75 percent of this group reported holding deposit accounts with a commercial bank and only 50 percent had requested and obtained a formal loan. These formal loans were also smaller than those acquired by the semi-perishable wholesalers. The average loan size was 40,000 FRW given for an average period of six months, at the on-going interest rate and secured by title to property. Participation in informal financial markets, on the other hand, was frequent. The majority of traders (75

traders (75 percent) received and granted informal loans to other traders based on reciprocity in amounts which ranged from 20,000 to 120,000 FRW. Moreover, the majority of these traders (75 percent) participated regularly in tontines. These tontines, in contrast to those among semi-perishable wholesalers, had an almost equal proportion of male and female members. Contributions in the tontines reported by this group were made on a weekly basis with an average amount of about 2,000 FRW.

C. Retailers

Five retail markets operate in and around the capital, Kigali. Various consumer commodities, ranging from clothing to food products, are sold in these markets. Fresh fruit and vegetable retailers purchase products from middlemen who sell from their trucks or purchase directly from farmers who come to these markets. Some retailers are also farmers who sell a portion of their produce in the market. The sale of tomatoes and green beans was examined in these retail channels for horticultural crops. Tomatoes were among the most abundant vegetables in the market and green beans represent an interesting crop because of their export potential.

A total of 15 retailers were interviewed during the survey (Table 22). Two thirds of these traders are women. There seem to be few differences in the operations of these traders except for their sources of supply. Tomatoes, on the one hand, are supplied mainly by wholesalers who operate trucks and to some extent by farmers. Green beans, on the other hand, are supplied mainly by farmers, and are sold by some producers in the market and to a very limited extent by traders.[17] Prices of both crops varied depending on the supply and competition in the market. The method of payment was mostly cash, except for occasional one day credit, covering a partial amount of the stock. The principal buyers were private consumers and sales were mainly in cash. One day credit contracts were occasionally given for regular established customers if short of cash. Advance payments, however, were not reported to be given by these retailers to their suppliers nor did they generally receive any advances from their customers.

Retailers rely mainly on retained earnings and informal finance to finance their operations. None of the 15 retailers reported ever requesting or receiving formal loans. However, almost all the retailers (93 percent) participated regularly in tontines. Most of these groups made contributions on a daily basis and a few had weekly rotations. The amounts ranged between 100 and 500 FRW and the rotations were often determined by lottery. Informal loans among retailers were also reported by about 50 percent of this group. These loans ranged from 200 to 2000 FRW and were based on reciprocity. Thus, the information collected from retailers confirms that trade credit is limited within the marketing channels from wholesalers to retailers to consumers. The most common financial arrangements are cash purchases and sales followed by informal loans made and received by the same type of economic agents, generally based upon reciprocity.

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[17] Only one retailer reported purchasing from a trader.

Table 22. Selected Characteristics of Perishable Vegetable[a] Retailers in Rwanda.

Selected Characteristics	Relevant Indicators
Sample Size	15
Types of suppliers	Truckers; Farmers; Own-Production
Frequency of purchase	Daily
Form of payment	Cash
Type of customers	Consumers
Form of payment	Cash
Gives informal loans	50%
Receives informal loans	50%
Received a formal loan	0%
Participates in Tontines	93%

Source: OSU survey, 1993.

[a] The perishable vegetables considered in the study are tomatoes and green beans.

D. Cooperatives

Agricultural cooperatives, as noted earlier, are very popular in Rwanda. Among the various cooperatives, one in particular was identified in this study as being active in the production and sale of horticultural crops. This cooperative has operated for about 20 years and is located in the peri-urban region around Kigali. Members of the cooperative (130 in total) grow various vegetables and fruits, such as green beans, tomatoes, carrots and onions, that are sold in a store the cooperative rents and operates in the city. The cooperative purchases crops three times per week only from farmer-members on a monthly supplier credit basis. That is, no down payment is made to the farmers at the time of purchase. The total quantity of crops is noted and the farmer signs a contract agreeing to receive the total payment at the end of the month.

The cooperative sells in its store mostly to private consumers. Sales have been made exclusively in cash for the past five years since the cooperative committee decided to stop all credit even to regular customers. One public program (an orphanage), however, purchases regularly from the cooperative on weekly basis with a credit arrangement. The orphanage receives a three month credit facility with no interest charges. The cooperative does not receive advance payment from any of its customers, nor does it sell on consignment.

The cooperative has a deposit account with the Banque Populair (BP) and acquired a 1 million FRW loan from this bank during 1993. The loan was given for a period of six months at 13 percent interest with a title to real estate property used as collateral. Some of the cooperative members (20) have also formed a tontine. The tontine brings together mostly men

farmers--there are only two women among the tontine members--with monthly contributions of 600 FRW where the rotation is, interestingly, determined by last name in alphabetical order. This cooperative is the only economic unit which receives its produce on credit (i.e no interest supplier credit from its farmer-members). However, since this credit is granted by the shareholders (i.e farmers) it is not quite the typical trade credit that is granted by wholesalers to retailers or by producers to retailers.

2. Financial Contracts

Financial contracts vary among the different agents in the Rwandan output marketing channels. The principal difference is the level of marketing, i.e. wholesale versus retail. Formal financial contracts are quite common among wholesalers, both in the form of loans and deposits, but they are almost non-existent among retailers. With respect to informal finance, as in the input networks, there is little trade credit flowing within the output marketing channels. Among the four subsectors considered, trade credit is most commonly observed among semi-perishables, especially the potato trade. The relative thinness of the vertical trade credit linkages may be contrasted with the abundance of the horizontal informal financial contracts among traders at the same stage in the marketing channel. That is, there exists a large amount of informal loans reciprocated among traders in the wholesaler group and similarly among traders in the retailer groups. Moreover, tontines are also popular among traders in each of these two groups. It can be concluded, therefore, that credit is not an important factor used to stimulate transactions among the various stages between producers and consumers. Rather it is popular among homogenous agents as a way to generate liquidity which may be used for a variety of purposes in addition to facilitating their trading operations. Therefore offering credit does not seem to be a major marketing tool among these agents.

VI. Non-traditional Agricultural Exports

Non-traditional agricultural exports in Rwanda principally consist of vegetables, fruits, flowers and ornamental plants. These new export products have only emerged in the past two years and they represent only little more than one percent of total agricultural exports (Table 9). Coffee is the leading agricultural export product, accounting for about 70 percent, while tea is in second place with about 27 percent. Horticultural export crops, namely apple bananas, french green beans and potatoes, represent about 0.5 percent of total agricultural exports. As noted earlier, the share of fresh fruits and vegetables in agricultural production is only about 2 percent (Table 11). Given this thin production base and small export activity, it was not difficult to identify the economic agents involved in non-traditional agricultural exports. Essentially two types of economic agents are currently involved in the export of horticultural crops from Rwanda.

The first exporter of non-traditional agricultural crops is the Project Loiret-Butare, discussed earlier, which is a French NGO involved in the export of green beans to France. The project was initiated in 1987 with reclamation of 87 hectares of swamp low-lands for agricultural production in Butare, Southern Rwanda. The project receives an annual subsidy from the Loiret

department in France to cover its operational costs. This initiative involves a group of local farmers who cultivate other subsistence crops in addition to green beans. The project provides extension services and quality control for green beans grown on about 30 hectares of project area, and provides fertilizer and pesticides free of charge. Farmers, however, are under an obligation to sell green beans to the project at 35 FRW/kg, a price set by the Ministry of Agriculture five years ago.

The project monitors the production of green beans and supervises farmers at harvest time. The farmers harvest the crop early in the morning and the project takes responsibility for packaging the beans, loading them on trucks, transporting them on a two hour trip to Kigali and shipping them by air to France. The whole operation is completed in one day, so the lack of refrigeration facilities in Rwanda does not affect the quality of green bean exports; however, it clearly requires tight coordination and rapid scheduling from harvest to shipping to meet airline schedules and to avoid spoilage.

The green beans are sold at about 18 FF/kg in France. The major component of total costs is shipping which is about 8 FF/kg by air. Production costs were estimated by the project at about 2-3FF/kg. The NGO/project manager reported losses for the first three years 1988-90; however, since 1991 the project has been able to make some profits. A wholesaler in Paris has been purchasing the Loiret-Butare green beans on consignment for the past three years. The project produces about 150 tons annually. The wholesaler benefits from a 10-15 percent price margin following French price regulations. At the end of each month or two, the wholesaler sends a wire transfer payment for past consignments to the project manager in Kigali at one of the commercial banks. In effect, the project provides one to two months supplier credit to the French wholesaler marketing the beans in France.

The second exporter of non-traditional agricultural crops is a private entrepreneur who has been involved mainly in the export of apple bananas to Switzerland since 1991. Other than this export activity, the entrepreneur operates a packaging business that allows him to self-finance his export costs. This entrepreneur, in contrast to the Loiret project, is not involved in the production of the crop exported. He manages the export operation by purchasing quality bananas one week in advance from outgrowers,[18] hires trucks to pick up the crop on the delivery day from producers, collects the bananas and sorts out the export quality in one day, and, finally, ships them the next day by air to Paris and then to Geneva. Bananas of lower quality are sold in the local market. The sale of export bananas, similar to green beans, is on consignment. The entrepreneur reported minimal losses due to the rejection of shipments. The bananas are harvested green which allows them about 7 days maturity before they reach the supermarkets in Switzerland in a ripened state.

The entrepreneur started with shipments of about one ton/week for the first year; however, he has been making weekly shipments of 2 tons to his counterpart in Switzerland for

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[18] The entrepreneur reported that he has agreements with about 100 outgrowers.

the past year. The Swiss importer pays the Rwandan entrepreneur through a wire transfer to one of the local commercial banks on average at the end of each month. Therefore, this entrepreneur is providing a one month supplier credit to the Swiss wholesaler. The entrepreneur reported that he is not making much profit since he receives only 1.25 FS/kg FOB from a sale price of 11-12 FS/kg in Geneva. However, since this is only the second year of operation, the entrepreneur considers this still a promotional stage. The entrepreneur is currently planning to expand his business to contract farmers to grow green beans for export. The plan is to provide inputs and technical advice to the farmers, and market the output in European markets.

These two cases represent the only initiatives discovered for non-traditional agricultural exports in Rwanda. Although very limited, these case studies provide insights into the strengths and weaknesses of the non-traditional agricultural exports in the country.

VII. Constraints on the Development of the Agri-business Sector

The input and output marketing networks in the agri-business sector in Rwanda were examined in this study. Several factors influence the market mechanisms that predominate in these systems. The factors that shape these market mechanisms include asset specificity, production uncertainty, market uncertainty, access to financial markets and access to information.[19] The following discussion assesses how these factors influence the structure and performance of the input and output subsectors examined in this study.

1. Input Systems

The input distribution networks in Rwanda evolved largely over the past decade primarily due to donor and government intervention. The input distribution system today continues to be largely dependent upon this intervention. The supply agents are mainly parastatal institutions that control the imports of fertilizer at subsidized prices. The substantial intervention into the supply of fertilizer in Rwanda made a major impact on how the existing marketing system has emerged.

At the import level, the fertilizer subsector in Rwanda is clearly at a pre-market stage. The pre-market stage describes the prevailing market structure where the existing institutions for the most part operate on a supply-leading approach, rather than demand driven, and provide in-kind subsidies to promote the development of agriculture. The only exception to this is OCIR-THE which presumably was importing fertilizer at world market prices before 1993, providing fertilizer to tea outgrowers on credit, recording good repayment rates, and making profits from

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[19] See Nagarajan and Meyer for a complete discussion of the impact of these factors on market mechanisms.

its sales. This marketing mechanism is similar to a resource providing contract[20] where OCIR-THE, a state-owned enterprise, provides inputs and market outlets for tea producers. OCIR-THE, however, does not have control over the production decisions of the tea outgrowers except for the few state-owned plantations that it operates itself However, OCIR-THE can still control the marketing (and deduct the loan obligations) of private growers since it is the only processor-buyer of tea in the country thereby ensuring its monopsonistic control over marketing. Furthermore, relatively stable and high tea prices generate sector-wide profitability. OCIR-CAFE, which unsuccessfully attempted to adopt this same input distribution system, provides a counter example of failure. APNI, the third parastatal involved in fertilizer imports, engages in the sale of fertilizer based on subsidized prices. The sustainability of both OCIR-CAFE and APNI as independent economic agents involved in fertilizer distribution would be doubtful without access to the EEC subsidy for inputs.

At the wholesale and retail levels of the fertilizer subsector in Rwanda, a few private entrepreneurs have began to emerge in the past two years. These entrepreneurs were already operating in the private sector, largely involved in trading consumer commodities. The distribution of fertilizer by these entrepreneurs follows the spot market mechanism,[21] where none of the traders engage in any other stage of commodity production or distribution. However, given the large subsidized intervention at the wholesale and retail levels by NGOs, it is not surprising that there is little private sector involvement in the marketing of fertilizer.

Pesticides, in contrast to fertilizer, are imported into Rwanda by a few private entrepreneurs. At the same time, the parastatal institutions, APNI and OCIR-CAFE, import pesticides at close to world market prices. Therefore, the marketing of pesticides is more demand driven than is fertilizer, where demand is market driven only in the potato and tea subsectors. Pesticides are marketed by private entrepreneurs in wholesale and retail markets largely through spot market transactions.

The supply leading public sector approach to the distribution of fertilizer at the import, wholesale and retail levels in Rwanda has constrained the emergence of an efficient private marketing system. The question that follows is: if parastatal institutions did not receive subsidies and did not intervene in this subsector, would private sector agents spontaneously emerge in the fertilizer market in Rwanda? The answer is not completely clear; however, we are able to provide some insights on this issue.

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[20] A resource providing contract involves a marketing firm which provides inputs for production and marketing outlets for its producers (Nagarajan and Meyer).

[21] Spot markets involve several firms that specialize in one or more stages of commodity marketing (Nagarajan and Meyer).

A. Profitability

The tea subsector, regardless of its limited scale, enjoys high returns in Rwanda. The coffee subsector, however, has experienced a sharp decline in returns with the drop in international coffee prices. Thus, although OCIR-THE and OCIR-CAFE are state-owned enterprises and have monopsonies on the purchase of tea and coffee, respectively, the former has succeeded in simulating a resource providing contractual arrangement with its producers while the latter has not. Both parastatals have high asset specificity, face a certain degree of production and market uncertainty, have good access to financial markets, and face little information asymmetry. The difference between the two parastatals seems to be the profitability of the subsectors in which they are specialized.

The limited private sector involvement in the wholesale and retail distribution of fertilizer is not surprising given the level of intervention in the subsector in Rwanda. Private entrepreneurs have emerged over the past few years to sell mainly to potato growers. The demand for fertilizer in the northern part of Rwanda, where potatoes are grown, increased as this production realized improved yields and enjoyed higher returns as a result of using modern inputs. With low asset specificity requirements and access to financial markets, private traders engaged in fertilizer sales to potato growers largely through spot markets at competitive prices. These contracts, however, did not emerge in other subsectors such as traditional domestic crops or fresh fruits and vegetables because of the smaller scale of these operations and the lower returns generated. The demand for pesticides and fertilizer by farmers is largely a function of the profitability of the crop. It is very difficult to convince a poor agricultural producer to invest in modern inputs when the returns on production are low.

B. Scale and Scope Economies

The emergence of private economic agents in the fertilizer and pesticide subsectors continues to be a challenge in Rwanda, as in many African countries. Although entrepreneurs might enjoy some scope economies[22], scale economies[23] are limited in the agricultural input subsectors, especially in small markets. Farmers are poorly informed about improved yields based on fertilizer and pesticide use and are uncertain how to use modern agricultural inputs in many cases. Nonetheless, in subsectors, such as tea, where there is a significant yield increase with the use of modern inputs even medium size plantations find it profitable to import fertilizer at world market prices for their own use.[24]

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[22] Economies of scope arise if two or more products can be jointly produced at a lower cost than is incurred in their independent production. In this case, there exists some input(s) which is (are) shared by two or more products without complete exhaustion of the resource(s).

[23] Economies of scale exist if per unit or average production costs decline as output rises.

[24] Information is based on an interview with the manager of a private tea plantation in Rwanda.

C. Small Land Holdings

The poverty and small land holdings in Rwanda restrict large scale production processes which employ yield enhancing inputs and technologies. Small land holdings also imply that farmers will purchase fertilizer and pesticides in only very small quantities. Traders have to undertake the cost of breaking down and repackaging the 50 kilogram fertilizer bags purchased from wholesalers to resell in smaller quantities to individual farmers.

D. Finance

Access to financial markets does not appear to be a problem for the few entrepreneurs currently involved in the wholesale trade of fertilizer and pesticides. These established entrepreneurs have been able to draw largely on their retained earnings from other business activities to engage in a limited scale of fertilizer sales mainly sold for cash. Pesticides are imported by private entrepreneurs using letters of credit from the domestic commercial banks. With increased competition, however, trade credit might become an important marketing tool, as in the case of other subsectors.[25] The terms of trade credit for fertilizer and pesticides are dependent on the production cycle of the crop on which these inputs are used. Clearly, higher risk is associated with longer production periods (long season crops compared to short season ones) because of increased asymmetric information problems.

2. Output Systems

The production of horticultural crops in Rwanda is limited. This study examined three relatively important output subsectors: potatoes, the most commercialized crop in Rwanda; dry beans, although a basic staple, the country is least self-sufficient in the production of this crop; and fresh fruits and vegetables--tomatoes, french green beans and bananas--which are important because of their export potential. The factors influencing the observed market mechanisms with respect to each of these subsectors will be discussed next.

The wholesale and retail trade in dry beans is characterized by spot market transactions. Wholesalers, although generally specialized in dry bean marketing, have a low investment in specific assets. There are relatively low production or market uncertainties in the dry bean subsector. Moreover, dry bean wholesalers utilize both formal and informal sources of finance. Interestingly, and common to spot market transactions, most sales are in cash. Little trade credit flows through the vertical marketing channel. Wholesale operators, in addition to using formal credit, obtain informal loans from their fellow wholesalers and participate in tontines at the retail level. This horizontal channel of finance at both levels of the marketing chain stands out in sharp contrast to the classic wholesale-retail flows of trade credit common in many developing and developed countries. This likely reflects the lack of well established and secure trading relationships between wholesalers and retailers in these markets in Rwanda which raises the risks

[25] See Baydas and Meyer.

of lending and borrowing. In contrast, the established relationships among those trading side by side in the market place creates sufficient confidence for reciprocal lending practices among these agents.

The potato wholesale and retail trade is also characterized by spot market transactions. Many potato traders are new entrants in the market. The low level of asset specificity involved and the minimal sunk costs required to carry out trading facilitates entry into this market. Potato production faces few uncertainties with the use of modern inputs. More importantly, with unsophisticated local and regional demand for high quality products, and with high yields and returns, market uncertainties are very low and regional export opportunities are quite high. Potato wholesalers, similar to dry bean wholesalers, engage less in vertical trade finance relative to other types of informal finance, such as tontines and reciprocal credit among wholesaler networks. Formal finance was also reported to be quite accessible by these traders.

The perishable fruits and vegetables of tomatoes, green beans and bananas were examined at the retail and wholesale/export levels. Tomatoes and green beans were typically sold at the retail level in spot market transactions. The production of these vegetables, although associated with relatively low asset specificity, involves relatively high production and market uncertainties. Production uncertainties grow out of the difficulties to control quality unless cultivation is closely monitored, while market uncertainty is strongly associated with the high degree of perishability of these crops. Access to finance in the case of retailers was limited to informal finance, largely tontines, and access to information was limited to the specific local retail markets in which they sell their produce.

The wholesale trade in perishable fruits and vegetables, however, was characterized by two market mechanisms. In the case of french green beans, on the one hand, a resource providing and production management contract is administered by the French NGO (Loiret-Butare). In order to ensure quality produce, this NGO provides modern inputs and seeds, technical assistance, agronomical supervision, packaging, and a marketing outlet for french beans outgrowers cultivating 30 hectares in the Loiret-Butare project. The project has access to finance and European market information, and has been exporting 150 tons annually for about 3 years. Thus, a certain amount of asset specificity clearly exists. The project has demonstrated a capacity to deal with production and market uncertainty by closely monitoring production and by selling on consignment to a wholesaler in France. The project has also dealt with financial requirements by drawing on a subsidy from the Loiret department and with informational requirements by gaining access to information about the French market. These factors illustrate the range and magnitude of large sunk costs required to initiate an export operation in the area.

In the case of the banana exporter, on the other hand, the contractual arrangement with banana outgrowers is a market specification contract. This contract involves only the marketing of the produce with production decisions left to outgrowers. The exporter has a low level of asset specificity and market uncertainties. However, this entrepreneur faces high production uncertainties from the small scale outgrowers typical of all farmers in the country. When initiating this activity, the entrepreneur had to incur some transaction costs to secure information

and relied mainly on retained earnings from other business activities to finance his export business.

A. Small Land Holdings

The most binding and difficult constraint for expanding the export potential of the country is the small land-holding pattern characteristic of most agricultural production. Large or medium sized commercial farms are not very common in Rwanda. This factor presents important production uncertainties for any marketing enterprise. It is particularly difficult to standardize production across a large number of outgrowers, especially when faced with high quality competition from Colombia and Kenya, the principal exporters of apple bananas and green beans to the European market.

B. Access to Information and Finance

A second constraint hindering the development of non-traditional agricultural exports is access to information and finance. These resources are costly for newly emerging private exporters to secure in Rwanda. However, bank financing is not the typical source of finance which economic agents use when engaging in new ventures. Evidence from the two case studies reported in this study indicate that retained earnings, savings and government funds have been used to initiate exports in Rwanda. This implies that private sector participation in non-traditional exports would have to utilize either personal funds for the initial investment stage or seek external finance from venture capital firms which are better suited to finance risky newly emerging activities than are banks or commercial lenders. The constraint is that venture capital firms are not likely to fund small horticultural exporters because of their limited scale and scope, inherent risks of production, quality of products and demand in export markets.

C. Transportation and Refrigeration Facilities

Air transportation costs are expensive and the availability of air freight services is limited in Rwanda. This is not surprising considering that Rwanda is a land-locked country in central Africa. Moreover, the lack of refrigeration facilities at the Kigali airport makes the time between harvest and transportation of perishable fruits and vegetables very critical. Such facilities would involve large investments and imply large costs for the enterprise.

VIII. Conclusions and Recommendations

The input and output distribution systems of the agricultural sector in Rwanda were examined in this study. The large intervention by the EEC and the government in the fertilizer distribution system, through a subsidized supply-leading approach, have generated a pre-market structure for this product market. It is only recently with new economic opportunities, realized through potato production and regional exports, that an effective demand for fertilizer has finally emerged. This has induced several private entrepreneurs to enter this subsector. With access to finance and information, and a minimum investment or specialization, entrepreneurs are able

to engage in spot market activities to market fertilizer at the wholesale and retail levels. The import level, however, is still largely distorted by the price subsidy which precludes the emergence of any private sector initiative at this level of operation.

Pesticides, in contrast to fertilizer, are imported into Rwanda by a few private entrepreneurs. At the same time, the parastatal institutions, APNI and OCIR-CAFE, import pesticides at close to world market prices. Therefore, the marketing of pesticides is more demand driven than is fertilizer, where fertilizer demand is market driven only in the potato and tea subsectors. Pesticides are marketed by private entrepreneurs at both the wholesale and retail levels largely through spot market transactions.

A number of factors present constraints to private sector participation in the distribution of modern inputs. First, farmer demand for pesticides and fertilizer is largely a function of the profitability of the particular crop. Unless farmers are engaged in potato or tea production, they are neither willing nor able to purchase these inputs. Second, although entrepreneurs might enjoy some scope economies, scale economies are limited because of the small total demand. Third, the small land-holding structure in Rwanda restricts large scale production processes that employ yield enhancing inputs and technologies. Access to financial markets does not appear to be a problem for the few entrepreneurs currently involved in the wholesale trade of fertilizer and pesticides. With increased competition, however, trade credit might become an important marketing tool, as in the case of other subsectors. The terms of trade credit for fertilizer and pesticides are dependent on the production cycle of the crop on which these inputs are used. Clearly, higher risk is associated with longer production periods because of increased asymmetric information problems for any input dealer extending credit to farmers.

To promote private sector initiative in the input marketing systems in Rwanda, certain conditions have to be ensured. In the case of pesticides, this implies reducing the quantities imported by parastatal institutions to allow private importers the opportunity to completely take over the import market. This in turn will further induce more private wholesale and retail marketing of pesticides to the extent there is an effective demand for the product. In the case of fertilizer, the primary condition to induce efficient private sector fertilizer marketing is to completely abolish import subsidies. This would imply that if economic opportunities exist--such as potato production which generates an effective demand for fertilizer--entrepreneurs would have an incentive to enter this subsector.

It is important to continue research efforts to improve yields through the utilization of improved seed varieties, use of modern agricultural inputs and new technologies. This will help identify and expand the production frontier in Rwanda and other African countries, as they search for their comparative advantage in growing new crops with an export potential in both regional or international markets. Extension efforts should continue to educate farmers on the advantages of using improved seed varieties, and modern inputs and technologies provided they are clearly profitable. The effective demand for these inputs and technologies will grow naturally with the farmers' realization of improved yields and higher returns due to increased

use of these inputs. The challenging question, however, is how to convince or induce the government to abolish fertilizer subsidies?

The production of horticultural crops in Rwanda is limited. This study examined three relatively important output subsectors. These are potatoes, dry beans and fresh fruits and vegetables, in particular tomatoes, french green beans and bananas. The wholesale and retail trade in dry beans and potatoes are largely characterized by spot market transactions. Wholesalers, although generally specialized in dry bean marketing, have a low investment in specific assets. Many potato traders are new entrants in the market indicating the low level of asset specificity needed and minimal sunk costs to carry out trading which facilitate entry in this market. There are increasingly more dry bean wholesalers becoming involved in potato marketing. Potato production faces few uncertainties with the use of modern inputs. More importantly, with unsophisticated local and regional demand for high quality products, and with high yields and returns, market uncertainties are very low and regional export opportunities are quite good.

Interestingly, and common to spot market transactions, most sales of potatoes and dry beans are made in cash. Little trade credit flows through the vertical marketing channel. Wholesale and retail operators, in addition to formal credit, draw upon informal loans from their fellow wholesalers and participate in tontines at the retail level. This horizontal channel of finance at both levels of the marketing chain stands out in sharp contrast to the classic wholesale-retail flows of trade credit common to more developed countries. This likely reflects the lack of well established and secure trading relationships between wholesalers and retailers in these markets in Rwanda which raises the risks of lending and borrowing. In contrast, the established relationships among those trading side by side in the market place creates sufficient confidence for reciprocal lending practices among these agents.

Perishable fruits and vegetables, tomatoes, green beans and bananas, were examined at the retail and wholesale/export levels. Tomatoes and green beans were typically sold at the retail level in spot market transactions. The production of these vegetables although associated with relatively low asset specificity, does involve relatively high production and market uncertainties. Production uncertainties grow out of the difficulties of quality control unless cultivation is closely monitored, while market uncertainty is strongly associated with the high degree of perishability of these crops. Access to finance in the case of retailers was limited to informal finance, largely tontines, and access to information was limited to the specific local retail markets in which they sell their produce.

The export of non-traditional crops from Rwanda is limited; however, there have been successful attempts to draw up contractual arrangements with green beans and banana outgrowers. These arrangements include resource provisions, production management and marketing outlets. The current export activities, however, are confined to small scale initiatives. Policy efforts should focus on reducing some of the constraints to promote private sector participation.

The first and most difficult constraint to ease to promote horticultural non-traditional exports is the small land-holding structure in Rwanda possibly through more efficient cooperative farming systems or larger units of production. This constraint increases transaction costs and reduces scale economies of production. Moreover, this constraint hampers the production of consistent quality produce that has export potential. Technical assistance should attempt to train farmers to grow quality produce. A second constraint hindering the development of non-traditional agricultural exports is access to information and finance. These resources are costly for newly emerging private exporters to secure in Rwanda. Third, air transportation costs are expensive and the availability of regular and reliable air freight services is limited. Attracting airline companies to Rwanda would induce more competition in air cargo which would bring transportation costs more in line with market prices. Fourth, and last, the lack of refrigeration facilities at the airport in Kigali makes the time between harvest and transportation of perishable fruits and vegetables critical. Such facilities would involve large investments and imply a large asset specificity cost for any single enterprise. However, investment in refrigeration facilities would reduce the constraints on export initiatives.

The prevailing conditions in Rwanda present binding constraints on the development of non-traditional agricultural exports. Public sector and donor intervention, however, could ease some those constraints. These efforts could largely focus on providing the appropriate information, infrastructure and technical support to encourage export activities. A potential role for the government, in addition to improving the quality of physical infrastructure in the country, could focus on stimulating domestic linkages with export markets. Facilitating information flows about foreign markets could be achieved by sending local representatives of traders associations abroad and providing information about domestic production to donors and foreign firms. Donors could play an important role in supporting local production of quality produce with export potential. One way to encourage the formation of export firms is to stimulate the creation of venture capital firms. Supporting supply-leading credit programs, however, should be avoided. Donors should carefully assess the role of support institutions, such as NGOs and cooperatives, that advice farmers on how to grow quality produce. The provision of technical assistance and the dissemination of new technologies to small producers in order to ensure the cultivation of high quality produce is the major challenge in the small land holding setting characteristic of Rwandan farmers.

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ANNEX
Persons and Institutions Visited in Rwanda.

- BICAHAGA, Chef du Service des Exportations, Banque Nationale du Rwanda.
- BWANAKEYE, Bibiane - Fondé de Pouvoir Principal et Chef du Département Commercial, Banque Commerciale du Rwanda, Kigali.
- Division des Statistiques Agricoles (D.S.A.) Ministry of Agriculture and Livestark, Daniel CLAY and David TARDIFF DOUGLIN (Researchers in Food Security Project - MICHIGAN state University and Development Alternatives Inc, respectively) et.
- FULLER, Kurt - USAID RWANDA (ADO).
- GASHUGI, Laurent - Chef de Division Alimentation et Intrants Agricoles (APNI) Ministry of Agriculture and Livestark.
- KARAMBI, Edouard - Directeur Technique A.A.S. - Africa Agro Services (Private Input Dealer).
- LOIRET-BUTARE Project, Interviews with Wholesalers and Technicians of Butare.
- MAKUBA, Aaron - Directeur d'AGRIMAK (Commerce d'intrants agricoles), Kigali.
- MERLET, Jean Yves - Chargé de Mission, Projet LOIRET-BUTARE, Kigali.
- MPENGEKERE, A. - Chef de Section Marketing - OPROVIA.
- MUNYAKAZI, Pierre Célestin - Directeur Général des ASSURANCES INGOBOKA, Kigali.
- MUNYANDAMUTSA, Télesphore - Responsable de l'Unité "APPUI-CONSEIL" au Centre IWACU, Centre de Formation et de Recherches Coopératives, Kigali.
- MURAKAZANDEKWE, Benoît Eugène - DIRECTEUR, Direction Financière - Union des Banques Populaires du Rwanda.
- MURATHET, Pierre Yvan - Responsable du Volet P.A.F. au Projet Unité Opérationnelle de Masaka (U.O.M.), Kigali.
- NELSON, Gary - Directeur Mission USAID au Rwanda, Kigali.
- NGIRA, Pierre - Chef du Service Produits Vivriers - OPROVIA.

- NIYIBIZI, Bonaventure - USAID - Kigali.
- NIYOMUGABO, Fulgence - Gérant d'Agence bancaire, Banque Commerciale du Rwanda, Butare.
- NSENGIMANA, Evase - Directeur de EMBALLAGE/RWANDA, Entreprise d'importation et Exportation.
- NTUYEHE, Emmanuel - Chef de Section Documentation, Banque Nationale du Rwanda, Kigali.
- NYABYENDA, Dr Pierre - Durecteur Scientifique, Institut des Sciences Agronomiques du Rwanda (ISAR) in Butare.
- PAGANIN, Paolo - Directeur d'AGROTECH _ KIGALI.
- RIDPATH, Norman - Directeur Génaral de SORWATHE, Kigali.
- RUKAKA, Assinapol - Chef du Service Technique - OCIR-THE.
- SCHMELING, Wolfgang - Directeur Adjoint, Union des Banques Populaires du Rwanda, Kigali.
- SIBOMANA, André - Chef de Service Production - Office du Café - RWANDA (OCIR-CAFE).
- SOMAYIRE, François - Expert National en Marketing International, C.C.I. - Centre du Commerce International CNUCED/GATT.
- SYLVESTRE, Etienne - Directeur, Service du Crédit, Banque de Kigali, Kigali.
- TEGERA, Pierre - Directeur du P.N.A.P. Programme National de la Pomme de Terre, Ruhengeri.
- VANSCHEPDAEL, Ronny - Chef de la Division Crédits, Banque Commerciale du Rwanda, Kigali.
- Interviews with: wholesalers of fertilizer and pesticides; wholesalers and truckers of dry beans and potatoes, wholesalers of tomatoes, and retailers of fresh vegetables in Kigali, Gisenyi and Ruhengeri markets.